Function & Arbitrary Waveform Generators

Selection Guide for Function Generators and other Signal Sources

	TYPE	FREQUENCY	MODEL	WAVEFORMS: Sine	Square	Triangle	TTL/CMOS	Ramp/Pulse	Arbitrary	Other	MODULATION: AM / FM	Other	SWEEP: Lin/ Log	Burst	OUTPUT RANGE into 50Ω	INTERFACE	PAGE
Direct Digital Synthesis (DDS)	Arbitrary/ Function	1μHz - 80MHz	4086AWG	√	√	√	√	√	√	noise, complex	int/ext	FSK, PSK	√	√	1mV - 10Vpp	RS232	34-35
		1μHz - 20MHz	4084AWG	√	√	√	√	√	√	noise, complex	int/ext	FSK, PSK	√	√	1mV - 10Vpp	RS232	
		DC - 31.5MHz	4071	√	√	√	√	√	√	DTMF, SSB	int/ext	FSK, PM, BPSK	√	√	4mV - 10Vpp	RS232	38-39
		DC - 21.5MHz	4070A	√	√	√	√	√	√	Dual Tone, noise	int/ext	FSK, PM, BPSK	√	√	4mV - 10Vpp	RS232	
		0.1Hz - 20MHz	4045	√	√	√	√	√	√	noise	int/ext		√	√	1mV - 10Vpp	RS232	40
	Function	1μHz -120MHz	4087	√	√	√	√	√		noise, complex	int/ext	FSK, PSK	√	√	1mV - 10Vpp	RS232	36-37
		1μHz - 80MHz	4086	√	√	√	√	√		noise, complex	int/ext	FSK, PSK	√	√	1mV - 10Vpp	RS232	
		1μHz - 40MHz	4085	√	√	√	√	√		noise, complex	int/ext	FSK, PSK	√	√	1mV - 10Vpp	RS232	
		1μHz - 20MHz	4084	√	√	√	√	√		noise, complex	int/ext	FSK, PSK	√	√	1mV - 10Vpp	RS232	
		0.1Hz - 20MHz	4040DDS	√	√	√	√	√			int/ext		√		1mV - 10Vpp		41
		0.1Hz - 12MHz	4013DDS	√	√	√	√	√					√		50mV - 10Vpp		43
		0.1Hz - 7mHz	4007DDS	√	√	√	√	√					√		50mV - 10Vpp		
		0.01Hz - 10MHz	4017B	√	√	√	√	√					√		1mV - 10Vpp	RS232	42
ANALOG	Multi-function	0.15Hz - 20MHz	4051	√	√	√	√	√			int/ext		√	√	100mV - 10Vpp	RS232	46-47
	Function	0.2Hz - 20MHz	4040A	√	√	√	√	√			int/ext		√		100mV - 10Vpp		44
		0.1Hz - 10MHz	4017A	√	√	√	√	√					√		100mV - 10Vpp		
		0.5Hz - 5MHz	4012A	√	√	√	√	√					√		100mV - 10Vpp		45
		0.5Hz - 5MHz	4011A	√	√	√	√	√							100mV - 10Vpp		
		0.5Hz - 4MHz	4003A	√	√	√	√	√					√		100mV - 10Vpp		49
		0.5Hz - 4MHz	4001A	√	√	√	√	√					√		100mV - 10Vpp		
		0.2Hz - 2MHz	4010A	√	√	√	√	√							100mV - 10Vpp		45
	Signal	100KHz - 150 MHz	2005B	√							int/ext*				100mVrms max		51
		0.1Hz - 10 MHz	3003	√	√										100mV - 2.25Vpp		50
	Pulse	0.1Hz - 10 MHz	4030		√										100mV - 5Vpp		48
	Audio	20Hz - 150kHz	3001	√	√										100mV - 2.5Vpp		51

* AM modulation only

Function Generators

Arbitrary/ Function Generators

Models 4084AWG & 4086AWG

The B+K Precision® 4084AWG and 4086AWG are high performance laboratory grade synthesized function generators with arbitrary capability. Direct Digital Synthesis (DDS) techniques are used to create stable, accurate output signals for all 27 built-in standard and complex (arbitrary) waveforms. The generators produce high purity, low distortion sine waves up to 80 MHz, square waves up to 40 MHz and a stable output of very small signals down to the 1mV - 10mV range. The instrument also provides a built-in 100 MHz Universal Counter with frequency measurement and totalize function.

Unmatched affordability and excellent performance make models 4084AWG & 4086AWG a perfect fit for many applications in Electronic Test and Design, Sensor Simulation and Education and Training.

Custom waveform generation made easy

In addition to the built-in complex waveforms, you can use the 4084AWG & 4086AWG to generate custom arbitrary waveforms

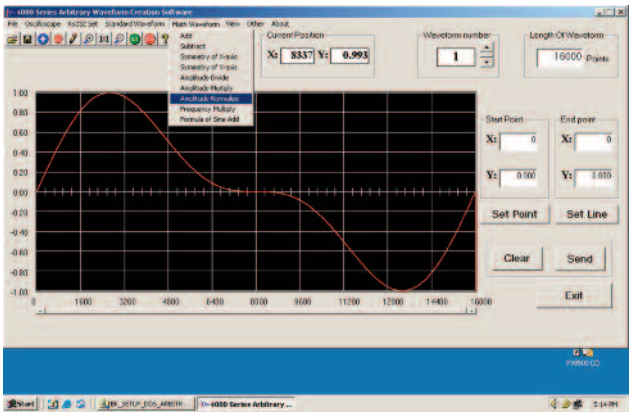


Fig1 Arbitrary Waveform Generation Software

with 10 bit vertical resolution, 16k memory depth and a sample rate of 200 MHz. Increase your productivity with the included intuitive Windows Software: Create and edit waveforms and download them to the instrument with a single click. Waveforms can be generated in many ways: Draw waveforms freehand, import them from a text file or start out with standard functions

and customize them with the provided math functions (fig1). Additionally, the software provides a direct interface to Tektronix® TDS1000, TDS2000 TPS2000 and TDS3000 series digital storage oscilloscope. Users can easily import waveforms originating from the DSO's display or internal memory and download and "replay" them on the instrument.

Versatile modulation and trigger capabilities

The generators provide extensive modulation capabilities including AM, FM, FSK, PSK, pulse modulation and linear/logarithmic sweep. Internal and external modulation sources, as well as internal, external and gated trigger sources are supported. Modulation parameters can be set precisely and are adjustable over a wide range. For instance, burst count is programmable in 1 burst increments up to 10000 bursts and burst phase is adjustable in 0.1° increments.

Convenient user interface and operation

You can adjust parameters via knob or numeric keypad. Enter amplitude values directly in Vpp, mVpp, Vrms, mVrms or dBm, and display the correct voltage by entering the actual output configuration used (terminated with 50 Ohm or open circuit). You can enter frequency in terms of frequency or seconds using time values s, ms, Hz, kHz or MHz. Submenus are used for modulation modes and other complex functions. The generators are fully programmable via the standard RS232 interface, using SCPI commands. The instrument also provides 10 memories to store and recall instrument settings. Additionally the current state is saved at power off and can be restored at power up.

TEL. (714) 921-9095, FAX (714) 921-6422

Specifications

	models 4084AWG	4086AWG
Frequency Characteristics		
Sine	1μHz ~ 20MHz	1μHz ~ 80MHz
Square	1μHz ~ 20MHz	1μHz ~ 40MHz
All Other waveforms	1μHz ~ 100kHz	
Frequency Stability	±1x10⁻⁶ (22°C ±5°C)	
Resolution	1μHz	
Accuracy	≤ ± 5x10⁻⁶ (22°C ±5°C)	
Data entry Units	s, ms, Hz, kHz, MHz	
Waveform Characteristics		
Main Waveforms (Sine, Square)		
Amplitude resolution	12 bits	
Sample Rate	200MSa/s	
Sine		
Harmonic Distortion of Sine Wave*	≤ - 50dBc (frequency ≤ 5MHz) ≤ - 45dBc (frequency ≤ 10MHz) ≤ - 40dBc (frequency ≤ 20MHz) ≤ - 35dBc (frequency ≤ 40MHz) ≤ - 30dBc (frequency > 40MHz)	
THD*	0.1% (20Hz ~ 100kHz)	
Square		
Rise and fall time*	≤ 15ns	
* = Note: Test conditions for harmonic distortion, sine distortion, rise/fall time Output Amplitude 2Vp-p, Environmental temperature: 25°C±5°C		
Others built-in waveforms		
27 build-in standard and complex waveforms	Sine, Square, Triangle, Positive Ramp, Falling Ramp, Noise, Pulse, Positive Pulse, Negative Pulse, Positive DC, Negative DC, Stair wave, Coded Pulse, Full wave rectified, Half-wave rectified, Sine transverse cut, Sine vertical cut, Sine phase modulation, Logarithmic, Exponential, Half-round, Sinx/x, Square root, Tangent, Cardiac, Earthquake, Combination	
Waveform Length	4096 dots	
Amplitude Resolution	10 bits	
Pulse		
Duty Cycle	0.1% ~ 99.9% (below 10kHz), 1% ~ 99% (10kHz ~ 100kHz)	
Rise/Fall Time	≤ 100ns (Duty Cycle 20%)	
DC signal characteristics		
DC range	≤ 10mV – 10V (high impedance)	
DC Accuracy	≤ ±5% of setting +10mV (high impedance)	
Arbitrary		
Non volatile memory	8 waveforms	
Waveform length	8~16000 points	
Amplitude resolution	10 bits	
Frequency range	1μHz~100kHz	
Sample rate	200MSa/s	
Amplitude Characteristics		
Amplitude Range (open circuit)	Freq ≤ 40MHz: 2mV ~ 20Vpp , 1mV ~ 10Vpp (50Ω) Freq > 40MHz: 2mV ~ 4Vp-p, 1mV ~ 2Vpp (50Ω)	
Resolution	2μVpp (open circuit), 1μVpp (50Ω)	
Accuracy	± 1%+0.2mV (sine wave relative to 1kHz)	
Stability	±0.5 % /3 hours	
Flatness		
For amplitude ≤ 2Vpp	±3% (freq≤ 5MHz), ±10% (5MHz<freq≤ 40MHz)	
For amplitude >2Vpp:	±5% (freq≤ 5MHz), ±10% (5MHz<freq≤ 20MHz) ±20% (frequency>20MHz) ±1dBm (frequency>40MHz)	
Output Impedance	50Ω	
Output Units	Vpp, mVpp, Vrms, mVrms, dBm	
DC Offset Characteristics		
Offset Range (open circuit) (Freq ≤ 40MHz)	±10Vpk ac+dc (Offset ≤ 2 x pk to pk amplitude) ±2Vpk ac+dc (Offset ≤ 2 x pk to pk amplitude)	
Offset Resolution	2μV (open circuit), 1μV (50Ω)	
Offset Error	±5% of setting +10mV (Ampl. ≤ 2Vpp into open circuit) ±5% of setting +20mV (Ampl. > 2Vpp into open circuit)	
Modulation		
AM Characteristics		
Carrier Waveforms	Sine or Square	
Modulation Source	Internal or external	
Internal Modulating Waveform	Sine, Square, Triangle, Rising/Falling Ramp	
Frequency of modulating signal	100μHz ~ 20kHz	
Distortion	≤ 2%	
Modulation Depth	1% ~ 120%, 1% ~ 80% (frequency>40MHz, Ampl > 2Vpp into open circuit)	
Modulation Error	± 5%+0.2% (100μHz < frequency ≤ 10kHz) ±10%+2% (10kHz < frequency ≤ 20kHz)	
Max. Amplitude of ext. input signal	3Vp-p (-1.5V~ +1.5V)	
FM Characteristics		
Carrier Waveforms	Sine or Square	
Modulation Source	Internal or external	
Internal Modulating Waveform	Sine, Square, Triangle, Rising/Falling Ramp	
Frequency of modulating signal	100μHz ~ 10kHz	
Deviation	Max. 50% of carrier frequency for internal FM Max 100kHz (carrier frequency≥ 5MHz) for external FM, with input signal voltage 3Vp-p (-1.5V~+1.5V)	
FSK Characteristics		
Carrier Waveform	Sine or Square	
Control Mode	Internal or external trigger (external: TTL level, low level F1, high level F2)	
FSK Rate	0.1ms ~ 800s	
PSK Characteristics		
Carrier Waveform	Sine or Square	
PSK	Phase 1 (P1) and Phase 2 (P2), range: 0.0 ~ 360.0°	
Resolution	0.1°	
PSK rate	0.1ms ~ 800s	
Control Mode	Internal or external trigger (external: TTL level, low level P1, high level P2)	
Burst Characteristics		
Waveform	Sine or Square	
Burst Counts	1 ~ 10000 cycles	
Time interval between bursts	0.1ms ~ 800s	
Control Mode	Internal, single or external gated trigger	
Frequency Sweep Characteristics		
Waveform	Sine or Square	
Sweep Time	1ms ~ 800s (linear), 100ms ~ 800s (log)	
Sweep Mode	Linear or Logarithmic	
Start/ Stop Frequency	Same as frequency range of Sine & Square	
External trigger signal frequency	DC ~ 1kHz (linear) DC~10Hz (log)	
Control Mode	Internal or external trigger	
Inputs/ Outputs		
Main Output		
Impedance	50Ω	
Protection	Short circuit and overload protected	
Output MOD OUT		
Frequency	100Hz ~ 20kHz	
Waveform	Sine, Square, Triangle, Rising/Falling Ramp	
Amplitude	5Vp-p ± 5%	
Output Impedance	600Ω	
Modulation IN	3Vpp = 100% Modulation	
External Input Trig/FSK/Burst	Level - TTL	
Universal Counter, Key Specs*		
Frequency Range		
Frequency Measurement	1Hz ~ 100MHz	
Totalize mode	50MHz max	
* For the full specification of the counter section refer to www.bkprecision.com		
General		
Power Supply	198~242V or 99~121V, Frequency: 47~ 63Hz	
Power Consumption	<35VA	
State Storage Memory		
Storage Parameters	frequency, amplitude, waveform, DC offset values, modulation parameters	
Storage Capacity	10 user configurable stored states	
Dimensions (W x H x D)	10" x 3.93" x 14.56" (255 mm x 100 mm x 370 mm)	
Weight	6.6lbs (3 kg)	
Remote Interface	RS232	
Safety designed according to	EN61010	
EMC tested according to	EN55022, EN55024, EN61326, EN601000	

Accessories

One Year Warranty

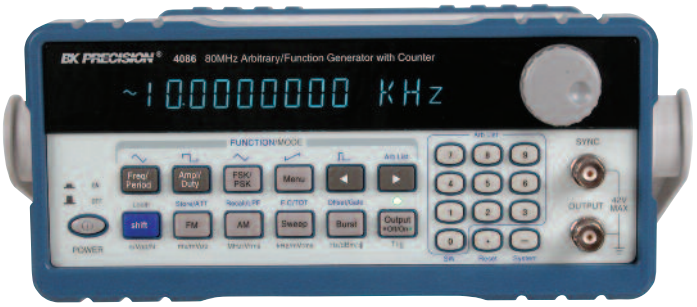
Accessories Included	BNC to alligator cable, BNC to BNC cable, RS232 communication cable, power line cord, test report, spare fuse, software installation disk.

NOTE: Specifications and information are subject to change without notice. Please visit www.bkprecision.com for the most current product information.

Function Generators

Programmable DDS Function Generator Series

Models 4084, 4085, 4086 & 4087



The B+K Precision® models 4084, 4085, 4086 and 4087 are high performance laboratory grade synthesized function generators with a wide frequency range of up to 120 MHz. Direct Digital Synthesis (DDS) techniques are used to create stable, accurate output signals for all 27 built-in standard and complex (arbitrary) waveforms. The generators produce high purity, low distortion sine waves, square waves up to 40 MHz and provide a stable output of very small signals down to the 1mV - 10mV range. The instrument also provides a built-in 100 MHz Universal Counter with frequency measurement and totalize function.

The versatility and capabilities of this series make it an ideal tool for many general-purpose test and bench applications or for use in Training and Education.

Versatile modulation and trigger capabilities
The generators provide extensive modulation capabilities including AM, FM, FSK, PSK, pulse modulation and linear/logarithmic sweep. Internal and external modulation sources, as well as internal, external and gated trigger sources are supported. Modulation parameters can be set precisely and are adjustable over a wide range. For instance burst count is programmable in 1 burst increments up to 10000 bursts and burst phase is adjustable in 0.1° increments.

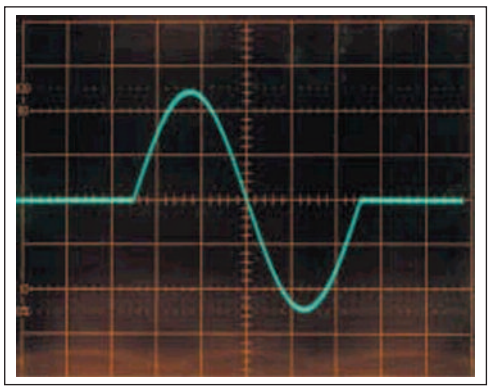


Fig1 Single cycle burst, start phase=0°

Convenient user interface and operation
You can adjust parameters via knob or numeric keypad. Enter amplitude values directly in Vpp, mVpp, Vrms, mVrms or dBm and display the correct voltage by entering the actual output configuration used (terminated with 50 Ohm or open circuit). You can enter frequency in terms of frequency or seconds using time values s, ms, Hz, kHz or MHz. Submenus are used for modulation modes and other complex functions. The generators are fully programmable via the standard RS232 interface, using SCPI commands. The instrument also provides 10 memories to store and recall instrument settings. Additionally the current state is saved at power off and can be restored at power up.

Specifications

	models 4084	4085	4086	4087
Frequency Characteristics				
Sine	1μHz ~ 20MHz	1μHz ~ 40MHz	1μHz ~ 80MHz	1μHz ~120MHz
Square	1μHz ~ 20MHz	1μHz ~ 40MHz	1μHz ~ 40MHz	1μHz ~40MHz
All Other waveforms	1μHz ~ 100kHz			
Frequency Stability	±1x10⁻⁶ (22°C ±5°C)			
Resolution	1μHz			
Accuracy	≤ ± 5x10⁻⁶ (22°C ±5°C)			
Data entry Units	s, ms, Hz, kHz, MHz			
Waveform Characteristics				
Main Waveforms (Sine, Square)				
Amplitude resolution	12 bits			
Sample Rate	200MSa/s			300MSa/s
Sine				
Harmonic Distortion of Sine Wave*	≤ - 50dBc (frequency ≤ 5MHz) ≤ - 45dBc (frequency ≤ 10MHz) ≤ - 40dBc (frequency ≤ 20MHz) ≤ - 35dBc (frequency ≤ 40MHz) ≤ - 30dBc (frequency > 40MHz)			
THD *	0.1% (20Hz ~ 100kHz)			
Square				
Rise and fall time*	≤ 15ns			
* = Note: Test conditions for harmonic distortion, sine distortion, rise/fall time Output Amplitude 2Vp-p, Environmental temperature: 25°C±5°C				
Others built-in waveforms				
27 build-in standard and complex waveforms	Sine, Square, Triangle, Positive Ramp, Falling Ramp, Noise, Pulse, Positive Pulse, Negative Pulse, Positive DC, Negative DC, Stair wave, Coded Pulse, Full wave rectified, Half-wave rectified, Sine transverse cut, Sine vertical cut, Sine phase modulation, Logarithmic, Exponential, Half-round, Sinx/x, Square root, Tangent, Cardiac, Earthquake, Combination			
Waveform Length	4096 dots			
Amplitude Resolution	10 bits			
Pulse				
Duty Cycle	0.1% ~ 99.9% (below 10kHz), 1% ~ 99% (10kHz ~ 100kHz)			
Rise/Fall Time	≤ 100ns (Duty Cycle 20%)			
DC signal characteristics				
DC range	≤ 10mV – 10V (high impedance)			
DC Accuracy	≤ ±5% of setting +10mV (high impedance)			
Arbitrary				
Non volatile memory	8 waveforms			
Waveform length	8~16000 points			
Amplitude resolution	10 bits			
Frequency range	1μHz~100kHz			
Sample rate	200MSa/s			
Amplitude Characteristics				
Amplitude Range				
For all models	Freq ≤ 40MHz: 2mV ~ 20Vpp (open circuit) , 1mV ~ 10Vpp (50Ω)			
4084, 4085, 4086	Freq > 40MHz: 2mV ~ 4Vp-p (open circuit), 1mV ~ 2Vpp (50Ω)			
4087	Freq > 40MHz: 0.1mV ~ 3Vpp (50Ω)			
Resolution	2μVpp (open circuit), 1μVpp (50Ω)			
Accuracy	± 1%+0.2mV (sine wave relative to 1kHz)			
Stability	±0.5 % /3 hours			
Flatness				
For amplitude ≤ 2Vpp	±3% (freq≤ 5MHz), ±10% (5MHz<freq≤ 40MHz)			
For amplitude >2Vpp:	±5% (freq≤ 5MHz), ±10% (5MHz<freq≤ 20MHz) ±20% (frequency>20MHz) ±1dBm (frequency>40MHz)			
Output Impedance	50Ω			
Output Units	Vpp, mVpp, Vrms, mVrms, dBm			
DC Offset Characteristics				
Offset Range (open circuit)	Freq ≤ 40MHz): ±10Vpk ac+dc (Offset ≤ 2 x pk - pk amplitude) Freq > 40MHz): ±2Vpk ac+dc (Offset ≤ 2 x pk - pk amplitude)			
Offset Resolution	2μV (open circuit), 1μV (50Ω)			
Offset Error	±5% of setting +10mV (Ampl. ≤ 2Vpp into open circuit) ±5% of setting +20mV (Ampl. > 2Vpp into open circuit)			
Modulation				
AM Characteristics				
Carrier Waveforms	Sine or Square			
Modulation Source	Internal or external			
Internal Modulating Waveform	Sine, Square, Triangle, Rising/Falling Ramp			
Frequency of modulating signal	100μHz ~ 20kHz			
Distortion	≤ 2%			
Modulation Depth	1% ~ 120%, 1% ~ 80% (frequency>40MHz, Ampl > 2Vpp into open circuit)			
Modulation Error	± 5%+0.2% (100μHz < frequency ≤ 10kHz) ±10%+2% (10kHz < frequency ≤ 20kHz)			
Max. Amplitude of ext. input signal	3Vp-p (-1.5V~ +1.5V)			
FM Characteristics				
Carrier Waveforms	Sine or Square			
Modulation Source	Internal or external			
Internal Modulating Waveform	Sine, Square, Triangle, Rising/Falling Ramp			
Frequency of modulating signal	100μHz ~ 10kHz			
Deviation	Max. 50% of carrier frequency for internal FM Max 100kHz (carrier frequency≥ 5MHz) for external FM, with input signal voltage 3Vp-p (-1.5V~+1.5V)			
FSK Characteristics				
Carrier Waveform	Sine or Square			
Control Mode	Internal or external trigger (external: TTL level, low level F1, high level F2)			
FSK Rate	0.1ms ~ 800s			
PSK Characteristics				
Carrier Waveform	Sine or Square			
PSK	Phase 1 (P1) and Phase 2 (P2), range: 0.0 ~ 360.0°			
Resolution	0.1°			
PSK rate	0.1ms ~ 800s			
Control Mode	Internal or external trigger (external: TTL level, low level P1, high level P2)			
Burst Characteristics				
Waveform	Sine or Square			
Burst Counts	1 ~ 10000 cycles			
Time interval between bursts	0.1ms ~ 800s			
Control Mode	Internal, single or external gated trigger			
Frequency Sweep Characteristics				
Waveform	Sine or Square			
Sweep Time	1ms ~ 800s (linear), 100ms ~ 800s (log)			
Sweep Mode	Linear or Logarithmic			
Start/ Stop Frequency	Same as frequency range of Sine & Square			
External trigger signal frequency	DC ~ 1kHz (linear) DC~10Hz (log)			
Control Mode	Internal or external trigger			
Inputs/ Outputs				
Main Output				
Impedance	50Ω			
Protection	Short circuit and overload protected			
Output MOD OUT				
Frequency	100Hz ~ 20kHz			
Waveform	Sine, Square, Triangle, Rising/Falling Ramp			
Amplitude	5Vp-p ± 5%			
Output Impedance	600Ω			
Modulation IN	3Vpp = 100% Modulation			
External Input Trig/FSK/Burst	Level - TTL			
Universal Counter, Key Specs*				
Frequency Range				
Frequency Measurement	1Hz ~ 100MHz			
Totalize mode	50MHz max			
* For the full specification of the counter section refer to www.bkprecision.com				
General				
Power Supply	198~242V or 99~121V, Frequency: 47~ 63Hz			
Power Consumption	<35VA			
State Storage Memory				
Storage Parameters	frequency, amplitude, waveform, DC offset values, modulation parameters			
Storage Capacity	10 user configurable stored states			
Dimensions (W x H x D)	10" x 3.93" x 14.56" (255 mm x 100 mm x 370 mm)			
Weight	6.6lbs (3 kg)			
Remote Interface	RS232			
Safety designed according to	EN61010			
EMC tested according to	EN55022, EN55024, EN61326, EN601000			

Accessories

One Year Warranty

Included	BNC to alligator cable, BNC to BNC cable, RS232 communication cable, power line cord, test report, spare fuse
Optional	TLFG kit

NOTE: Specifications and information are subject to change without notice. Please visit www.bkprecision.com for the most current product information.

Function & Arbitrary Waveform Generators

4070A

31.5MHz Function Generator - Model 4071
21.5MHz Function Generator - Model 4070A

B+K Models 4070A & 4071 represents the finest single source for signal generation to date. Combining the latest DSP and DDS technologies, models 4070A & 4071 offers a number of operating modes, providing a versatile, cost-effective signal source. You will find both models are the best value and most capable instrument for any bench. Arbitrary Waveforms, Sweep Functions, Pulse, VCO, AM, FM, Phase Modulations, FSK and Burst Modes are all accessed quickly and easily from the front panel keypad. Being true 12 bit arbitrary generators, the 4070A & 4071 are stable, accurate and drift free. Unlike competitive models, the 4070A & 4071 generates data point independently of the repetition rate instead of from a simple look-up table. Custom design waveforms on a PC, or download from a spread sheet, oscilloscope or application program - the 4070A & 4071 will perform like no other signal source.

■ **Arbitrary Waveform Generation**
Design custom waveforms on your PC and download for generation 40 MS/s max update rate 12 bit resolution, 32K buffer. Arbitrary waveforms may be designed with a graphical Windows® based design tool, which is available for free download from www.bkprecision.com.

■ **Function Generator**
Generate Triangle, Ramp, Sinewave, and others.

■ **Pulse Generator**
Digital waveforms with an adjustable duty cycle.

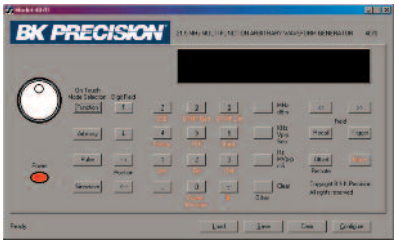
■ **High Stability Timebase**
Guarantee ±10 ppm over 32˚ to 104˚F (0 to 40°C)

■ **Modes**
- **Basic Sine/Square Wave**
- **Linear/Log Sweep (Free Run or Triggered)**
- **Internal/ External AM, FM, PM, SSB**
- **Internal/ External BPSK**
- **Internal/ External FSK (Ext FSK to 3MHz)**
- **Burst (Int/Ext trigger)**
- **DTMF Generation**
- **DTMF Detection**
- **Power Measurement**
- **Dualtone Generation**
- **Arbitrary Waveform**
- **Function Generator**
- **Pulse Generator**

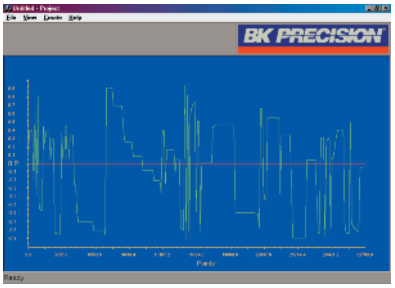
4070A, 4071 Standard Features
DC offset capability
TTL/CMOS sync output available in all modes
RS232 remote control (Easy to use) Code examples included.
External logic input for gating or output signal and triggering.
Easy software updates via Flash memory.
Configuration save/restore: 10 complete front panel setups.

The B+K Precision 4070A & 4071 represents a major breakthrough in signal generation and analysis. This versatile instrument has capabilities that allow the engineer to use it in a broad range of that include communications, radio, telephony, analog/digital circuit design and test.

The 4070A & 4071 are much more than a signal generator. Never before has so much versatility, capability and performance been packed into a single low-cost instrument. Its architecture is based on the latest advances in DSP and DDS technology which not only ensures calibrated and drift-free performance, but also gives the engineer signal analysis functions such as DTMF Detection and Power Level Measurement. The capabilities of the 4070A & 4071 can continually be enhanced and expanded by downloading software upgrades to internal Flash memory.

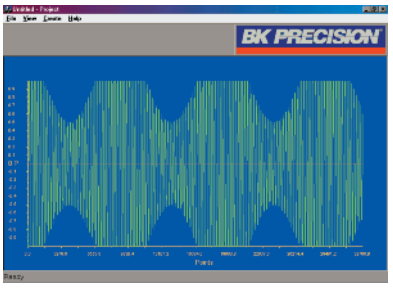


Control Panel



Freehand Waveform

Both Models delivers clean, fully synthesized, modulated or unmodulated waveforms with 0.01Hz frequency resolution. User-friendly features include a large, easy-to-read illuminated LCD display which allows the user to see all modulation parameters simultaneously and a full numeric keypad and encoder which provide direct editing of each parameter. No confusing sub-menus!



Amplitude Modulation Waveform

The Arbitrary Waveform Generator allows you to design custom waveforms on your personal computer and download them to the 4070A & 4071 which generates them in real-time. The Arbitrary Waveform Generator system is also used to generate pulse waveforms with an adjustable duty cycle and a suite of pre-stored Function Generator waveforms. Arbitrary waveforms may either be designed with a graphical Windows®-based design tool or be generated point-by-point in a variety of data formats from your own application software. A floppy diskette with a data generator program, example waveforms, and a downloader utility are included with this option.

Function & Arbitrary Waveform Generators

Specifications

	models 4070A, 4071
MAIN OUTPUT	
Frequency:	DC to 21.5 MHz, 31.5 MHz (Model 4071), 0.01 Hz Steps
Level:	4 mVp-p to 10.000 Vp-p, 1mV steps (into 50Ω) or -44 dBm to +24 dBm, 0.1 dBm steps (into 50Ω) in Function, Arbitrary and Pulse modes. 4 mVp-p to 5.0 Vp-p, 1mV steps (into 50 Ω) or -44.0 dBm to +18 dBm, 0.1 dBm steps (into 50 Ω) in Sinewave, AM, FM, PM, SSB, Sweep, VCO, Burst, DTMF, Dualtone, BPSK, and FSK modes.
Level Accuracy:	±1%
Sinewave Distortion	<1%
Flatness:	± 0.2 dB (DC-10 MHz), ±0.4dB (10MHz - 21.5MHz) @5Vpp (into 50 Ω)
DC offset:	0V to ±6 V, 1 mV steps (into 50 Ω)
Output impedance:	50 Ω
Freq. accuracy:	±10 ppm (.001%), (@50Ω)
Phase Noise:	< -55 dBc in a 30 kHz band
Spectral Purity(@5Vpp):	DC to 100 kHz: > -50 dBc
100 KHz to 1 MHz:	> -45 dBc
1 MHz to 12 MHz:	> -40 dBc
12 MHz to 21.5 MHz:	> -35 dBc
Distortion:	0.01Hz to 100KHz≤ 1%
SYNC OUTPUT	
Amplitude:	0V to +5V p-p (TTL/CMOS comp.)
Fall Time:	5 ns.
Rise Time:	< 8 ns. 10% to 90%
Output current:	±24 mA. max
RS232 PORT	
Asynchronous, no parity, 1 start bit, 1 stop bit.	
Baud rate:	Adjustable, 300 bps to 115,200 bps.
Remote operation from a terminal or host computer.	
EXTERNAL MODULATION INPUT	
Maximum full scale input:	±5 V (10 Vp-p)
Input Impedance:	30 kΩ
EXT. TRIGGER/GATING/FSK/BPSK INPUT	
Input impedance:	80 kΩ
Max. input level:	±10V
Max. gating freq:	3 MHz
EXT. ARB CLOCK INPUT	
Input level:	TTL/CMOS
Max. clock freq:	40 MHz
OPERATING MODES	
The carrier frequency for all modulation modes are 0 Hz to 21.5000000 MHz	
(Model 4070A), 0 Hz to 31.5000000 MHz (Model 4071), 0.01 Hz steps.	
All internal modulation frequencies are synthesized and are accurate to 0.01%.	
BASIC SINEWAVE (CW) MODE	
Output frequency:	0 Hz to 21.5 MHz, 31.5 MHz (Model 4071), .01 Hz Steps
FREQUENCY MODULATION (FM) MODE	
Int. modulation freq:	0 Hz to 10 kHz, 1 Hz steps
Ext. modulation freq:	DC to 35 kHz
Peak frequency deviation:	0 Hz to ±5.0 MHz, 1 Hz steps
PHASE MODULATION (PM) MODE	
Int. modulation freq:	0 Hz to 10 kHz, 1 Hz steps
Ext. modulation freq:	DC to 35 kHz
Peak phase deviation:	0 to ±180°, 1° steps
SWEEP MODE	
Start/Stop freq:	0 Hz to 21.5 MHz, 31.5 MHz (Model 4071), .01 Hz Steps
Linear or Log sweep. Up or Down sweep direction	
Continuous or Int/Ext Triggered sweep	
Sweep time:	1 ms to 60 sec. 1 ms steps.
VOLTAGE CONTROLLED OSCILLATOR MODE	
Endpoint frequencies:	0 Hz to 21.5 MHz, 31.5 MHz (Model 4071), .01 Hz Steps
Control input range:	-5.0V to +5.0V
Control signal bandwidth:	DC to 35 kHz
BURST MODE	
Continuous or Triggered from Front Panel, RS232, or Ext. TTL	
On Time:	1 mS to 99.999 Sec, 1 mS steps
Off Time:	0 mS to 99.999 Sec, 1 mS steps

DUAL TONE MULTI FREQUENCY (DTMF) GENERATE MODE	
Dialing digits generated:	0 to 9, #, *, A, B, C, D
Duration:	1 mS to 10.000 Sec, 1 mS steps
Delay:	0 mS to 10.000 Sec, 1 mS steps
CUSTOM DUAL TONE GENERATE MODE	
Tone 1, Tone 2 Frequency:	DC to 10.000 kHz, 1 Hz steps
Phase Offset:	0 deg. to 359 deg., 1 deg. steps
Output ON time:	Cont. or 1 ms to 10.000 sec, 1 ms steps
Output OFF time:	0 ms to 10.000 sec, 1 ms step.
AMPLITUDE MODULATION (AM) MODE	
Int. modulation freq:	0 Hz to 10 KHz, 1 Hz steps
Ext. modulation freq:	DC to 35 kHz
Percentage modulation:	Variable 0% to 100%, 1% steps
SINGLE SIDEBAND (SSB) MODE	
Int. modulation freq:	0 Hz to 1.0 MHz, 1 Hz steps
Ext. modulation freq:	DC to 8500 Hz
Upper or Lower Sideband selectable	
FREQUENCY SHIFT KEYING (FSK) MODE	
Int. modulation freq:	0 Hz to 130 kHz, 1 Hz steps
Ext. modulation freq:	0 Hz to 3 MHz
Mark/Space freqs:	0 Hz to 21.5 MHz, 31.5 MHz (Model 4071), 0.01 Hz steps
DATA MODULATION MODE	
Baud Rate:	0 Hz to 130 kHz, 1 Hz steps
Message length:	1 to 960 bits. Nonvolatile storage: 10 locations
Mark/Space frequencies:	0 Hz to 21.5 MHz, 31.5 MHz (Model 4071), 0.01 Hz Steps
POWER & VOLTAGE MEASUREMENT MODE	
Input signal level:	±5 V max. (10Vp-p)
Input signal bandwidth:	DC to 50 kHz
Power calc. impedance:	Variable from 1 to 999 Ω
BINARY PHASE SHIFT KEYING (BPSK) MODE	
Int. modulation freq:	0 Hz to 130 kHz, 1 Hz steps
Ext. modulation freq:	0 Hz to 10 kHz
DUAL TONE MULTI FREQUENCY (DTMF) DETECT MODE	
DTMF digits detected:	0 to 9, #, *, A, B, C, D
Detection range:	10 Vp-p max., 20 mVp-p min.
Detection time:	100 ms
ARBITRARY WAVEFORM GENERATOR MODE	
Vertical Resolution:	12 bits
Sample Rate:	Variable from 0Hz to 40 Msamples/Sec. in .1 Hz steps
Sample Buffer Depth:	32,768 data points
Data Formats Supported:	Floating Point, Decimal, Hexadecimal, Integer, Binary, Digital, CSV and PRN formats
Nonvolatile waveform storage:	1 location, 32,768 points
FUNCTION GENERATOR MODE	
Waveforms:	Pos. Ramp, Neg. Ramp, Triangle, Pos. Exponential, Inverted Pos. Exponential, Neg. Exponential, Inverted Neg. Exponential, Random (noise), Sinewave
Repetition Rate:	0 Hz to 2 MHz in 1 Hz steps, all functions
Run Mode:	Continuous or Internal/External Triggered
PULSE GENERATOR MODE	
Frequency:	0 Hz to 2 MHz in 1 Hz steps
Duty Cycle:	Variable 0% to 100% in 1% steps
Tr, Tf:	≤ 40nS (10% to 90%, 1Vp-p) Variable in amplitude and offset, TTL/CMOS output also.
GENERAL	
Power:	100-240 VAC 47-63 Hz, 30W, 3 prong IEC conn.
Display:	2 line by 40 character, LCD, backlit.
Weight:	3.5 lbs. (1.6 kg)
Dimensions (H x W x L):	5.5 x 11.75 x 10.375" (140 x 298 x 264mm)
Operating Temperature:	32° to 104°F (0° to 40°C) ambient.
Stored instrument setups:	10, including 1 power-up state

Accessories

Two Year Warranty

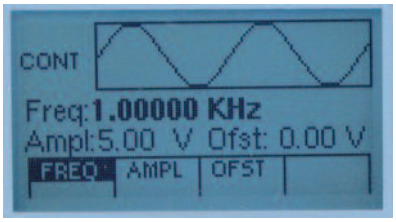
SUPPLIED: Manual, Line Cord
OPTIONAL: Carrying Case LC 40, TLFG Kit

Function Generators

DDS Sweep Function Generator with Arbitrary Function

Model 4045

Graphical LCD Display



The model 4045 is a must have for anyone needing a feature packed precision generator. A menu-driven front panel operation with an easy-to-read graphic LCD display makes the 4045 easy to operate. Parameter changes and data entry can be made using the rotary knob or via the build-in RS-232C interfaces. Waveform editing can be done from scratch or by modifying standard waveforms.

The 4045 can generate standard or user-defined waveforms with crystal controlled sampling rates of up to 20MHz, 12 bit vertical resolution and up to 1,000 points. All waveforms are internally generated with amplitudes to 10Vp-p into 50ohm. An offset generator allows generation of signals with large offsets. A full range of triggering capabilities is available, including internal-external trigger source, gated and burst modes of operation.

- **20MHz Frequency Range (sine & square only)**
- **Sine, Square, Triangle & Arbitrary Waveforms**
- **Modulation in both AM & FM**
- **Lin or Log Sweep Function**
- **Bright Informative LCD**
- **RS-232C Interface**

Specifications

	model 4045
FREQUENCY CHARACTERISTICS (STANDARD WAVEFORMS)	
Sine	0.1Hz to 20MHz
Square	0.1Hz to 20MHz
Triangle , Ramp	0.1Hz to 2MHz
Accuracy	0.005 % (50 ppm)
Resolution	6 digits or 10mHz
ARBITRARY CHARACTERISTICS	
Waveform Length	2 points to 1,000 points
Vertical resolution	12 bits
Sampling rate	20 ns to 50 s
Accuracy	0.005 % (50 ppm)
Resolution	4 digits
OUTPUT CHARACTERISTICS	
Amplitude Range	10mV to 10Vp-p into 50Ω
Resolution	3 digits (1000 counts)
Amplitude Accuracy	± 2% ± 20mV of the programmed output from 1.01V- 10V
Flatness	0.5 dB at 1MHz, 1 dB to 20 MHz
Offset Range	± 4.5V into 50Ω, depending on the Amplitude setting
Offset Resolution	10 mV with 3 digits resolution
Offset Accuracy	± 2% ± 10mV into 50Ω
Output Impedance	50Ω
Output Protection	The instrument output is protected against short circuit or accidental voltage practically available in electronic laboratories, applied to the main output connector
WAVEFORM CHARACTERISTICS	
Harmonic Distortion	DC-20KHz, -55 dBc, 20KHz-100KHz, -50dBc 100KHz-1MHz, -40 dBc, 1MHz-20MHz, -30 dBc
Spurious	DC-1MHz, <-60 dBc
Square Rise/Fall Time	< 18ns (10% to 90%) at full amplitude into 50Ω
Variable Duty Cycle	20% to 80% to 2MHz for Square and 10%-90% for Triangle
Symmetry at 50%	< 1 %
OPERATING MODES	
Continuous	Output continuous at programmed parameters.
Triggered	Output quiescent until triggered by an internal or external trigger, then one waveform cycle is generated to programmed parameters, up to 10MHz trig rate for ARB waveforms and 1MHz in DDS mode
Gate	Same as triggered mode, except waveform is executed for the duration of the gate signal. The last cycle started is completed.
Burst	2 - 65,535 Cycles
Trigger Source	Trigger source may be internal, external or manual. Internal trigger rate 0.1Hz - 1MHz (1us - 10 s)
MODULATION CHARACTERISTICS	
Amplitude Modulation	
Internal	0.1 - 20KHz Sine signal or triangle waveform Variable modulation from 0% to 100% in 1% steps
External	5 Vp-p for 100% modulation, 10KΩ input impedance, DC to 20KHz bandwidth.
Frequency Modulation	
Internal	0.1 - 20KHz Sine signal or triangle waveform
External	5 Vp-p for 100% deviation, 10KΩ input impedance,
SWEEP CHARACTERISTICS	
Sweep Shape	Linear and Logarithmic, up or down
Sweep Time	10 ms to 100 s.
Sweep trigger	Internal, external, or continuos or burst
INPUTS AND OUTPUTS	
Trigger In	TTL compatible. Max. rate 10MHz. Minimum width 50ns.
Sync Out	TTL pulse at programmed frequency, 50Ω source impedance.
Modulation IN	5 Vp-p for 100% modulation . 50KΩ input impedance. Dc to >20KHz minimum bandwidth.
GENERAL	
Store memory	20 full panel settings at power-off
Arbitrary memory	1,000 points in flash memory
Dimensions (WxHxD)	8.4" x 3.5" x 8.3" (213mm x 88mm x 210mm)
Weight	5.5 lbs. (2.5 Kg)
Power	90V-264V, 30 VA max
Temperature	
Operating	0°C to +50°C,
Non-operating	-10°C to +70°C

Accessories

Two Year Warranty

SUPPLIED: Manual, Line Cord
OPTIONAL: TLFG Kit

TEL. (714) 921-9095, FAX (714) 921-6422

20MHz DDS Sweep Function Generator

Model 4040DDS

The model 4040DDS is a low cost, full featured Direct Digital Synthesis (DDS) generator with a menu-driven front panel interface that includes a large, easy-to-read graphical LCD display. Waveform parameter changes and data entry can be made using the front panel rotary knob. The unit generates superb quality waveforms with high signal precision and stability. It provides sine & square wave outputs over the frequency range from 0.1 Hz to 20 MHz in one extended range (triangle/ramped wave outputs to 2MHz). A full range of triggering capabilities is available, including internal-external trigger source, gated and burst modes of operation.

- **20MHz Frequency Range (sine & square only)**
- **Sine, Square & Triangle**
- **Modulation in both AM & FM**
- **Lin or Log Sweep Function**
- **Adjustable Duty Cycle**
- **Adjustable DC Offset**
- **Bright Informative LCD**

Specifications

model	4040DDS
FREQUENCY CHARACTERISTICS (STANDARD WAVEFORMS)	
Sine	0.1Hz to 20MHz
Square	0.1Hz to 20MHz
Triangle , Ramp	0.1Hz to 2MHz
Accuracy	0.01 % (100 ppm)
Resolution	4 digits or 10mHz
OUTPUT CHARACTERISTICS	
Amplitude Range	10mV to 10Vp-p into 50Ω
Resolution	3 digits (1000 counts)
Amplitude Accuracy	± 2% ± 20mV of the programmed output from 1.01V- 10V
Flatness	0.5 dB at 1MHz, 1 dB to 20 MHz
Offset Range	± 4.5V into 50Ω, depending on the Amplitude setting
Offset Resolution	10 mV with 3 digits resolution
Offset Accuracy	± 2% ± 10mV into 50Ω
Output Impedance	50Ω
Output Protection	The instrument output is protected against short circuit or accidental voltage practically available in electronic laboratories, applied to the main output connector
WAVEFORM CHARACTERISTICS	
Harmonic Distortion	0-20KHz, -50 dBc, 20KHz-100KHz, -45dBc 100KHz-1MHz, -40 dBc, 1MHz-20MHz, -30 dBc
Spurious	DC-1MHz, <-55 dBc
Square Rise/Fall Time	< 20ns (10% to 90%) at full amplitude into 50Ω
Variable Duty Cycle	20% to 80% to 2MHz for Square and 10%-90% for Triangle
Symmetry at 50%	< 1 %
OPERATING MODES	
Continuous	Output continuous at programmed parameters.
Triggered	Output quiescent until triggered by an internal or external trigger, then one waveform cycle is generated to programmed parameters, up to 2MHz
Gate	Same as triggered mode, except waveform is executed for the duration of the gate signal. The last cycle started is completed.
Trigger Source	Trigger source may be internal, external or manual. Internal trigger rate 10us to 10s.
MODULATION CHARACTERISTICS	
Amplitude Modulation	
Internal	Sine signal of 1000Hz Variable modulation from 0% to 100% in 1% steps
External	5 Vp-p for 100% modulation, 10KΩ input impedance, DC to 20KHz bandwidth.
Frequency Modulation	
Internal	Sine signal of 1000Hz
External	5 Vp-p for 100% deviation, 10KΩ input impedance, DC to 20KHz bandwidth.
SWEEP CHARACTERISTICS	
Sweep Shape	Linear and Logarithmic, up or down
Sweep Time	10 ms to 50 s.
INPUTS AND OUTPUTS	
Trigger In	TTL compatible. Max. rate 2MHz. Minimum width 50ns.
Sync Out	TTL pulse at programmed frequency, 50Ω source impedance.
Modulation IN	5 Vp-p for 100% modulation . 10KΩ input impedance. Dc to >20KHz minimum bandwidth.
GENERAL	
Dimensions (WxHxD)	8.4" x 3.5" x 8.3" (213mm x 88mm x 210mm)
Weight	5.5 lbs. (2.5 Kg)
Power	90V-264V, 30 VA max
Temperature	
Operating	0ºC to +50ºC,
Non-operating	-10ºC to +70ºC
EMC	According to EN55011 for radiated and conducted emissions.
Electrical Discharge Immunity	According to EN55082
Safety Specifications	According to EN61010

Accessories

Two Year Warranty

SUPPLIED: Manual, Line Cord
OPTIONAL: TLFG Kit

Function Generators

10MHz DDS Sweep Function Generator
Model 4017B

Up to 10MHz available on Sine, Square & Ramp waveforms

B&K Precision model 4017B is a true function generator in its line that offers DDS (Direct Digital Synthesis) technology allowing to generate very precise and accurate waveforms with little distortion.

- **Multi-function LCD displays all output parameters:**
  - **Frequency**
  - **Level**
  - **Offset**
  - **Duty Cycle**
- **Up to 10MHz available on Sine, Square & Ramp waveforms**
- **Frequency resolution down to 0.01Hz**
- **RS-232 Interface**
- **0 to 100% duty cycle**
- **Variable DC offset**

The 4017B enhances the performance achieved by its successful predecessor, BK Precision Model 4017A Sweep/Function Generator.
These performances are achieved by using direct digital waveform synthesis (DDS) techniques for generating high accuracy and precision frequencies. A high performance Digital Signal Processor (DSP) controls every aspect of the DDS system, and is used for precise generation and processing of waveforms. The 4017B has a vast number of applications in both analog and digital electronics, in the engineering, manufacturing, servicing, educational and hobbyist fields.
This versatile signal source is capable of generating waveform (such as sine, triangle and square), pulse generation (through variable symmetry) and frequency sweep. Additionally, the instrument provides a built-in frequency counter

Specifications

model	4017B
Frequency Characteristics	
Waveforms	Sine, Square, Triangle, ±Pulse, ±Ramp
Range	0.01Hz to 10MHz in 5 ranges
Resolution	5 digits
Variable Duty Cycle	0 to 100% cont variable
Fine	±5% of coarse setting
Operating Modes	Normal, sweep, VCG
Frequency Stability	Output will change less than 0.009% over 15-minutes after 1-hour warm-up
Output Level Characteristics	
Impedance	50W ± 10%
Level	0.02 to 20 Vp-p Open circuit 0.01 to 10Vp-p into 50 W (Accuracy: ±50mVp-p)
Amplitude	Variable
Attenuation	2 Ranges one with a -20 dB (±1 dB) and one without
DC Offset	Preset: ±0.1 V typical Variable: ±10V open-circuit ±5 into 50 W
SINE Wave	
Distortion	≤ 1% typical at 1kHz
Flatness	±5% ±(.45 dB)
Square wave	
Symmetry	0.1Hz to 100kHz < 2%
Rise time	≤ 20 ns (10% to 90%)
Triangle Wave	Linearity: ≥ 98% to 100 kHz
TTL Output	
Threshold Level	0.8V to 2.4V
Rise time	≤ 25nS (10% to 90% of Threshold)
Duty Cycle	50% typical
CMOS Output	
Max. Frequency	10 MHz
Level	4V to 14V ±0.5Vp-p (cont. variable 5MHz max.)
Rise Time	≤ 120nS (10% to 90%)
VCG (Voltage Controlled Generator)	
Input Voltage	0-10V ±1V causes a 100:1 frequency change
Impedance	10k W ±5%
Sweep Operation	
Mode	LIN/LOG
Width	100:1 continuously variable, 3-digit resolution
Rate	0.01s to 30s cont variable, 4-digit resolution
Sweep Output	0 to 10Vpp (into 50W)
Frequency Counter	
Range	5Hz to 100MHz (1 & 10S Gate) 50Hz to 100MHz (01S Gate) 100Hz to 100MHz (0.01S Gate)
Accuracy	Time base accuracy +1 count
Time Base Accuracy	±10ppm (23° ±5°C)
Display	9 digit LED
Aging	±5ppm/year
Input	50mVpp to 10Vpp
External Input	
Power Source	110/220 VAC +10% 50/60 Hz, internal jumper selectable
Dimensions (HxWxD)	4.2 x 10.5 x 12.25" (107 x 267 x 311mm)
Weight	6 lbs. (2.7 kg)

Accessories

Two Year Warranty

SUPPLIED	Output Cable with BNC to Alligator Clips, Instruction Manual (CD)
OPTIONAL	TLFG Accessory kit

DDS Function Generators
Models 4007DDS & 4013DDS

4007DDS

The models 4007DDS & 4013DDS are a versatile sweep function generators utilizing an advanced Direct Digital Synthesis (DDS) design. These units generates superb quality waveforms with high signal precision and stability. It provides sine & square wave outputs over the frequency range from 0.1 Hz to 7MHz (4007DDS), 0.1 Hz to 12MHz (4013DDS) in one extended range (triangle/ramped wave outputs to 100KHz for (4007DDS) & (triangle/ramped wave outputs to 1MHz for model 4013DDS). Front panel operation with an easy-to-read 4 digit LCD display makes these units easy to operate, they are the perfect instruments for educational, R&D, manufacturing test systems, and service and repair environments.

Parameter changes and data entry can be made using the front panel up or down keys and modified with the rotary knob. The sweep output waveforms can be linear or logarithmic, internally swept, up or down, over the full unit range. The sweep start and stop frequencies can be independently adjusted and the sweep rate can be set from 100ms to 30s. All waveforms are internally generated with amplitudes to 10Vp-p into 50 ohm. An offset generator allows generation of low amplitude signals with large offsets.

- **7MHz (4007DDS), 12MHz (4013DDS) Frequency Ranges (sine & square only)**
- **Sine, Square, Triangle**
- **Line, Log Sweep Function**
- **Adjustable Duty Cycle & DC offset**

Specifications

	models 4007DDS	4013DDS
Waveforms		
Sine, square and triangle	0.1Hz to 7MHz	0.1Hz to 12MHz
Operating Modes		
Continuous	Output continuous at selected frequency.	
Symmetry	Square symmetry is continuously adjustable from 15% to 85%.	
Sweep	The output waveform can be linear or logarithmic internally swept, up or down, over the full unit range. The sweep start and stop frequencies can be independently adjusted and the sweep rate can be set from 100ms to 30s.	
Frequency Characteristics		
Range	0.1 Hz to 7 MHz for Sine and Square waveforms. To 100 kHz for Triangle waveforms.	
Control	The frequency is selected with front panel up or down keys and modified with a rotary digital control.	
Display	Up to 4 digits with large, bright LCD, ranging units (MHz, kHz, Hz and mHz) and decimal point. Waveform accuracy is 0.01% (100 ppm).	
Output Characteristics		
Amplitude Range	Up to 10 Vp-p into 50_ (20 Vp-p into open circuit)	
Amplitude Control	> 20 dB continuously variable.	
Amplitude Attenuator	20 dB.	
Amplitude Flatness	±1 dB to 7MHz.	±1 dB to 12MHz.
Offset Range	Variable up to ±10V (±5V into 50Ω). Absolute peak amplitude plus offset limited to ±10V (±5V into 50Ω).	
Output Impedance	50Ω	
Output Protection	The generator main output is non-destructively protected against short circuit to ground or to any voltage practically available in electronic laboratories.	
Waveform Characteristics		
Harmonic Distortion	< -50 dBc, 0 - 20 kHz (< 0.3%) < -40 dBc, 20 kHz - 100 kHz < -35 dBc, 100 kHz - 1 MHz < -30 dBc, 1 MHz - 7 MHz	
Spurious	< -50 dBc, 0 - 1 MHz	
Triangle Linearity	> 99% to 100 kHz.	
Square Transition Times	< 25 ns (10% to 90%) at full output amplitude terminated into 50Ω.	
Inputs and Outputs		
Sync Out	TTL level square wave at generator frequency, in phase with main output and 50Ω impedance. Can drive > 20 TTL loads.	
General		
Operating Temperature	0°C to +50°C	
Power Requirements	100V - 240V, ±10%, 48 - 66 Hz single phase, < 25 VA.	
Dimensions (WxDxH)	8.4" x 8.3" x 3.5" (213 x 210 x 88 mm)	
Weight	4.4 lbs. (2 kg)	
Regulatory Standards	IEC 1010-1, Insulation category II, Pollution Degree 2.	
EMC	EN50081-1 and EN50082-1.	
CE Labeled		

Notes: Specifications apply at 25 ± 5°C ambient temperature and after 30 minutes warm up.

Accessories

Two Year Warranty

SUPPLIED: Instruction manual & power cord

OPTIONAL: TLFG Accessory kit

Function Generators

Specifications

	models 4040A	4017A
Frequency Characteristics		
Waveforms	Sine, Square, Triangle, ±Pulse, ±Ramp	
Range	0.2 Hz to 20 MHz in 8 ranges	0.1 Hz to 10 MHz in 8 ranges
Resolution	5 digits	
Tuning Range	10:1	
Fine	±5% of coarse setting	
Variable Duty Cycle	15:85:15 cont variable	
Operating Modes	Normal,Sweep, VCG, AM,FM,burst	Normal, Sweep, VCG
Output Characteristics		
Impedance	50Ω ±10%	
Level	20 V p-p Open circuit, 10V p-p into 50Ω	
Amplitude	Variable, 20 dB range typical	
Attenuation	-20 dB ±1dB	
DC Offset	Preset ±0.1 V typ Variable: ±10V open-circuit ±5 into 50Ω	
SINE Wave		
Distortion	≤3% typical at 1 kHz	
Flatness (Into 50Ω)	±5%±(.45 dB) 0.1 Hz to 10 MHz	
	±20%±(2.0 dB) 10 MHz to 20 MHz (4040A) @3V p-p	
Square wave		
Symmetry	0.2 Hz to 100 kHz <2%	0.1 Hz to 100 kHz <2%
Rise time (Into 50Ω)	≤ 30 nS	
Triangle Wave	Linearity: ≥ 98% to 100 kHz	
TTL Output		
Level	0.8V to 2.4V	
Rise time	≤ 20 nS (Between 0.8V to 2.4V)	
Duty Cycle	50% typical	
CMOS Output		
Max. Frequency	2 MHz	
Level	4V to 14V ±0.5 p-p cont. variable	
Rise Time	≤ 120 nS (Open circuit)	
VCG (Voltage controlled generator)		
Input Voltage	0-10V ±1V causes a 100:1 frequency change	
Impedance	10kΩ ±5%	
Sweep Operation		
Mode	LIN/LOG	
Width	100:1 continuously variable	
Rate	20 ms to 2 s cont variable	0.5 s to 30 s cont variable
Start/Stop Frequencies	Adjustable	NA
Frequency Counter		
Accuracy	Time base accuracy ±1 count	
Time Base Accuracy	±10 ppm (23° ±5°C)	
Display	5 digit LED	
Mode	INT or EXT	INT
External Input		
Frequency	5 Hz to 30 MHz	Does not apply
Resolution	0.1, 1, 10, 100, 1 kHz	
Sensitivity	25mVrms	
Power Source	120/230 VAC ±10% 50/60 Hz, internal jumper selectable	
Dimensions	5.5 x 11.75 x 10.575" (140 x 298 x 264mm)	4.5x 11.75 x 10.575" (114 x 298 x 264mm)
Weight	4.5 lbs. (2 kg)	4 lbs. (1.8 kg)

Accessories

Two Year Warranty

SUPPLIED: Output Cable with BNC to Alligator Clips, Instruction Manual, Line Cord
OPTIONAL: Carrying Case (not included): LC 40, TLFG Kit

4040A

4017A

10 MHz Sweep/Function Generator with Digital Display

Model 4017A

- **0.1 Hz to 10 MHz**
- **Linear and log sweep**
- **5 digit LED display**
- **All features of Model 4011A**

20 MHz Sweep/Function Generator with Frequency Counter

Model 4040A

- **0.2 Hz to 20 MHz**
- **AM & FM modulation**
- **Burst operation**
- **External frequency counter to 30 MHz**
- **5 digit LED display**
- **Plus all features of Model 4017A**

Specifications

	model 4040A
AM MODULATION CHARACTERISTICS	
Source	Internal/ External
Modulation Ratio	0 to 100%
Int modulation	1 kHz
Ext Modulation	DC to 500 kHz
Ext Sensitivity	Less than 10V p-p for 100% modulation
FM MODULATION CHARACTERISTICS	
Source	Internal, External
Modulation Ratio	0 to 100%
Deviation	0 to 5%
INT Modulation	1 kHz
Ext Modulation	DC to 500 kHz
Ext Sensitivity	Less than 10V p-p for 100% modulation
BURST CHARACTERISTIC	
Source	Internal, External
Burst Width	Cont. variable from 5% to 90% of internal gating frequency
Repition Rate	0.5 Hz to 50 Hz, internal
	DC to 500 kHz external
External Level	TTL levels
Burst Frequency	Determined by main generator frequency setting

Function Generators

5 MHz Function Generator with Digital Display

Model 4011A

- 0.5 Hz to 5 MHz
- Sine, Square, Triangle, Pulse, & Ramp output
- Coarse and Fine tuning
- 4 digit LED display
- Variable duty cycle
- Variable DC offset

4011A

5 MHz Sweep Function Generator Model 4012A

- 0.5 Hz to 5 MHz
- Sine, Square, Triangle, Pulse, & Ramp output
- Coarse and Fine tuning
- 4 digit LED display
- Variable duty cycle
- Variable DC offset
- Variable amplitude output plus 20dB attenuator
- 20Vpp output into open circuit (10Vpp into 50Ω)

4012A

2 MHz Function Generator

Model 4010A

- 0.2 Hz to 2 MHz
- Sine, Square, Triangle, Pulse, & Ramp output
- Variable duty cycle
- Variable DC offset

4010A

Specifications

	4011A, 4012A	models 4010A
Frequency Characteristics		
Waveforms	Sine, Square, Triangle, ±Pulse, ±Ramp	
Range	0.5 Hz to 5MHz	0.2 Hz to 2MHz
	in 7 ranges, 8 ranges(4012A)	in 7 ranges
Resolution	4 digits	NA
Dial Accuracy	NA	±5% typical
Tuning Range	Coarse, 10:1	10:1
	Fine±5% of coarse setting	Does not apply
Variable Duty Cycle	15:85:15 Cont variable	15:85:15 cont variable
Operating Modes	Normal, VCG	Normal, VCG
Output Characteristics		
Impedance	50Ω ±10%	
Level	20 V p-p Open circuit, 10V p-p into 50Ω	
Amplitude	Variable, 20 dB range typical	
Attenuation	-20 dB ±1dB	
DC Offset	Preset ±0.1 V typ Variable: ±10V open-circuit ±5 into 50Ω	
SINE Wave	Distortion: ≤ 3% @ 1kHz Flatness: ≤ 5% (.45 dB)	Distortion: ≤ 4% @ 1kHz Flatness: ≤ 5% (.45 dB)
Square Wave		
Symmetry	0.5Hz to 100KHz, 0.1Hz to 100 KHz(4012A), ≤ 2%	
Risetime (Into 50Ω)	≤ 20 nS, ≤ 30 nS (4012A)	≤ 120 nS
Triangle Wave	Linearity: ≥ 98% to 100 KHz, ≥ 95% to 2 MHz	
TTL Output		
Level	0.8V to 2.4V	
Rise time (0.8V to 2.9V)	≤ 20 nS	≤ 50 nS
Duty Cycle	50% typical	
CMOS Output		
Max. Frequency	2 MHz	
Level	4V to 14V ±0.5 p-p cont. variable	
Rise Time	≤ 120 nS (Open Circuit)	
Input VCG		
Input Voltage	0-10V ±1V causes a 100:1 frequency change	
Impedance	10KΩ ±5%	
Sweep Operation(4012A)		
Mode(4012A)	LIN/LOG	NA
Width(4012A)	100:1 continuously variable	NA
Rate(4012A)	0.5 s to 2 s cont variable	NA
Frequency Counter INT		
Accuracy	Time Base Accy ±1 count	NA
Time Base Accuracy	±10 PPM (23°C ±5°C)	NA
Display	4 digit LED	NA
Power Source	120/230 VAC ± 10%, 50/60 Hz, internal jumper selectable	
Dimensions (H x W x D)	4.5 x 11.75 x 10.375" (114 x 298 x 264 mm)	
Weight	4 lbs (1.8 kg)	

Accessories

Two Year Warranty

SUPPLIED: Output cable with BNC to alligator clips, Instruction Manual, Line Cord
OPTIONAL: Carrying Case (not included): LC 40, TLFG kit

Function Generators

Multi-Function Generator with Power Supply Model 4051

The model 4051 is a programmable multifunction generator that is extremely versatile and affordable. It is the perfect instrument for R&D, Manufacturing Test Systems, Educational and Training applications, and Service and Repair. In addition to the standard features one would expect on a function generator, the Model 4051 adds an adjustable triple output switching power supply, universal logic probe, auto-ranging frequency counter and a digital voltmeter. All of these features allow the user to analyze and measure many aspects of an electronic circuit.

Five instruments integrated into one compact machine

- **20MHz Sweep Function Generator**
- **35MHz Universal Logic Probe**
- **80W Triple Output Switching Power Supply**
- **Auto-Ranging Frequency and Totalize Counter**
- **Auto-ranging Digital Voltmeter**

Utilizing a standard 115VAC power source, B+K Precision's Model 4051 is capable of producing precision sine, square, triangle, +/- pulse, or +/- ramp waves over the 0.15Hz to 20MHz in 8 ranges. This encompasses subaudible, audio, ultrasonic and RF applications.

Extremely versatile, B+K Precision's new Model 4051 combines several functions such as waveform generation, pulse generation (through variable symmetry), an adjustable triple output switching power supply, universal logic probe, auto-ranging frequency counter and a digital voltmeter frequency sweep, into one device. The instrument also provides the added convenience of a built-in frequency counter. This permits more accurate determination of output frequency than is possible with a simple calibrated dial. Coarse and fine tuning controls permit precision setting of the output frequency. A continuously variable DC offset allows the output to be injected directly into circuits at the correct DC bias level.

Operating as a Sweep Generator, the Model 4051 offers linear or log sweep with variable sweep rate and adjustable sweep time. Variable symmetry of the output waveform converts the instrument to a Pulse Generator capable of generating rectangular waves or pulses, ramp or saw tooth waves, and slewed sine waves.

- **Easy to learn user-friendly interface**
- **One-touch access to system operations**
- **Integrated instruments and unified system ground**
- **Auto-frequency locking capability**
- **Active system setting stored to working memory**
- **Storage system for back of system states**
- **High brightness back lit LCD display**
- **RS-232 serial port for remote operation**
- **Multi-function simultaneous operation**
- **Heat activated cooling fan**

System integration features of the B&K model 4051

Eliminates Ground Loop Current

Save time , improve accuracy and make hassle-free measurement with the B&K 4051. All five of the B&K 4051's integrated instrument share one unified system ground, eliminating ground loop current

Auto Frequency Locking

Unlike conventional locking generators, the output frequency of the B&K 4051 can be automatically locked within ±0.2 range at the tuned frequency without drift cause by temperature, moisture or component degeneration

Cost Effective and Compact

Combining the circuitry of the different instruments allows B&K to deliver all five for the price of one cost effective and compact package that will save money and save space on your test bench

Function Generators

Specifications

model	4051
Frequency Characteristics	
Wave forms	Sine, Square, Triangle, ±Pulse, ±Ramp
Range	0.15Hz to 20MHz in 8 ranges
Resolution	0.01, 0.1, 1, 10, 100Hz Display
Tuning Range	Coarse: 10:1, Fine: ±3% of Coarse Setting
Variable Duty Cycle	15:85:15 Continuously variable
Operating Modes	Normal, Sweep, VCG, AM, FM, Single Burst, Multiple Burst
Frequency Stability	±0.2% of the tuning frequency
Output Characteristics	
Impedance	50Ω ±10%
Level	200 mV to 20 Vp-p Open-circuit, 10 Vp-p into 50Ω to 10 MHz
Amplitude Control	Variable, 20 dB range typical
DC Offset	Preset: ±0.10 V typical, Variable: ±10 V open-circuit, ±5 V into 50Ω
Sine Wave	
Distortion	<1.0% THD from 10 Hz to 100 kHz
Flatness	±3% (0.3 dB) 0.15Hz to 200kHz ±5% (0.45 dB) 200kHz to 10MHz ±20% (2.0 dB) 10MHz to 20MHz
Square Wave	
Symmetry	<2% 0.15Hz to 100kHz
Rise Time	≤ 20 ns
Overshoot & Undershoot	≤ 6%
Triangle Wave	
Linearity	98% up to 100 kHz
TTL Output (Open-Circuit Condition for Frequencies ≤ 2 MHz)	
Max. Logic Low Level Voltage	≤ 0.4 V
Min. Logic High Level Voltage	≥ 2.6 V
Rise Time	≤ 15 ns
Duty Cycle	50% typical
CMOS Output (Open-Circuit Condition for Frequencies ≤ 2 MHz)	
Level	Output from 3.0 V to 15.0 V ±0.5 Vp-p
Rise Time	≤ 120 ns
VCG (Voltage Controlled Generator) Input	
Input Voltage	0-10 V ±0.5 V causes a 10:1 frequency change
Impedance	10 kΩ ±5%
Sweep Operation	
Mode	LIN/LOG
Source	Internal, External
Width	10:1, continuously variable
Rate	10 ms to 1 sec, continuously variable
Sweep Output	0 to 2 V
Start/Stop Frequency	By digital setting
AM Modulation Characteristics	
Source	Internal, External
Modulation Ratio	5% to 100%
INT. Modulation	1 kHz
EXT. Modulation	DC to 500kHz
EXT. Sensitivity	Less than 10 Vp-p for 100% modulation
FM Modulation Characteristics	
Source	Internal, External
Deviation	0 to 5%
INT. Modulation	1kHz
EXT. Modulation	DC to 500kHz
EXT. Sensitivity	Less than 10 Vp-p for 100% modulation
Burst Characteristics	
Mode	Multiple, Single, or Key controlled one shot
Source	Internal, External
Burst Width	Continuously variable from 5% to 90% of internal gating frequency
Repetition Rate	0.5Hz to 50Hz, internal or DC to 500kHz external
Burst Frequency	Determined by the main generator frequency setting. Tone burst is in integral cycles of gated frequency.
Frequency Counter (Display shown "EXT. CNTR")	
Range	3.0Hz to 35MHz Auto-ranging
Resolution	0.01, 0.1, 1, 10, 100Hz
Max. Display	6 digits
Input Port	Logic Probe or EXT. CNTR BNC Jack

Auto-Ranging Counter	
Input Characteristics	
Impedance	1 MΩ/100 pf
Coupling	AC (Ext. counter BNC input)/DC (logic probe input)
Max. Overload Protection	±260 V AC/DC
Sensitivity	≤ 0.45 Vrms
Accuracy	Time base accuracy ±1 count ±trigger
Triggering Threshold	Selectable for TTL, CMOS, logic threshold or 0 - 3.5 V continuously adjustable triggering level.
Low Frequency Counter (Display shown "EXT. CNTR TOTAL")	
Range	0.04 Hz to 3Hz
Resolution	0.01, 0.001Hz
Max. Display	4 digits
Input Port	Logic Probe only
Transition (Totalize) Counter (Display shown "TOTAL")	
Frequency Range	up to 5.0kHz
Max. Display	6 digits
Reset Key	"CAL"
Input Port	Logic Probe for DC coupling or EXT. CNTR BNC Jack when frequency is greater than 3Hz.
Auto-Ranging DVM	
Input Range	0 to ±2.500 V, ±25.00 V DC, ±250.0 V Auto-ranging
Resolution	1 mV, 10 mV, 100 mV
Accuracy	±0.75%
Input Protection	Max. ±260 V DC/AC
Impedance	1 MΩ
Max. Display	4 digits
Universal Logic Probe	
Logic Threshold	
	TTL / **CMOS**
High Threshold	2.0 V ±10% / 70% Vdd* ±15%
Low Threshold	0.8 V ±10% / 30% Vdd* ±15%
*Vdd is controlled by C-Level	
Max. Repetitive	35 MHz (With probe miniature clip to GND)
Frequency Response	
Min. Single Pulse Detection	15 ns (With probe miniature clip to GND)
Display Format	Logic High, Logic Low, Square clock, Positive Going Pulse, Negative Going Pulse, Tri-state.

Triple Output DC Power Supply

	Vcc	+Vs	-Vs
Output Voltage	5 V/3.3 V	0~+24 V	0~-24 V
Output Current			
Min.	5.0 A	1.5 A	.5 A*
Max.	6.5 A	2.0 A	1.5 A*
DVM display	3-digit	4-digit	4-digit
Overload Protection	Short Circuit, Over-current, Over-voltage, Reverse Polarity, Over-temperature		
Ripple & Noise	10 mVrms	10 mVrms	10 mVrms
Dual Tracking**	N/A	YES	YES

* For continuous operation, the output current of -Vs supply reduces as output voltage drops. (see 3.14 for limitations of the -Vs supply)

** -Vs tracks +Vs or independent adjustment

Physical Properties	
Dimensions	5.3" x 9.5" x 10.5" (135 x 241 x 267 mm)
Shipping Weight	7.5 lbs (3.4 kg)
Power Requirements	115 VAC or 230 VAC 10% 50Hz or 60Hz, Approximately

Accessories

One Year Warranty

SUPPLIED	Operational manual, AC power cord, BNC cable with clips, Logic Probe
OPTIONAL	RS-232C D-sub 9-pin Male to Female interface cable, TLFG kit, LC 40 Carrying Case

Pulse Generator

10 MHz Pulse Generator with 4-Digit LED Display

Model 4030

B&K Precision Model 4030 is a versatile signal source which combines four functions into one unit – waveform generation, pulse generation (through variable symmetry), frequency sweep operation, and triggered operation. The 4030 offers low rise and fall time pulsed signals up to 10MHz to meet many test and measurement applications.

Applications

With this versatility, it has a vast number of applications in both analog and digital electronics in the engineering, manufacturing, servicing, educational, and hobbyist fields.

B+K Precision's Model 4030 is capable of producing pulsed waveforms with variable symmetry and amplitude to test for a variety of applications including:

- **Testing and troubleshooting digital logic circuits**
- **Interfacing between different logic families**
- **Testing response time of opto-isolators**
- **Testing shift registers.**

Some of the unique features of the B+K Precision Model 4030 include:

- **Manual mode that allows one pulse to be generated each time a pushbutton is pressed, making it convenient for stepping a circuit, one pulse at a time.**
- **Normal or inverted polarity pushbutton.**
- **External triggering mode allows pulse generator to be synchronized to an external signal, such as external clock frequency signal.**
- **Separate trigger output is also available. This output is commonly used to trigger an oscilloscope, so that the leading edge of a pulse can be viewed but the output can be used as a simultaneous pulse output with independently variable pulse width.**

Specifications

model	4030
Frequency Range	
Internal	0.1Hz to 10MHz in 8 decade ranges & variable
X'Tal Spot freq.	1Hz, 10Hz, 100Hz, 1KHz, 10KHz, 100KHz, 1MHz, 10MHz.
Rate	100nS – 0.1S
Width	50nS-50mS (6 decade ranges & variable)
Delay	0-2uS variable w.r.t. trigger
Stability X'tal Mode	200 ppm
Warm up Time	30 minutes
Triggering	
Internal	0.1Hz to 10MHz
External	10Hz to 10MHz
Manual	1 pulse per sec
Ext. Trig-Input	+1V to +10V p-p sine & square waveform
Frequency Counter	
Range	0.1Hz to 10MHz
Display	4 digit counter with internal, External and Auxiliary mode
Display Accuracy	±0.5% ±1 count
Output Polarity	Normal/Inverting
Output	
Pulse Out	0.5V-5V at 50W
Impedance	50Ω
Rise & Fall Time	10μS approximately
Output Terminal	BNC Connector
Power Supply	
Voltage	115/230V AC +10%, 50/60Hz
Consumption	10VA
Physical	
Dimensions (WxHxD)	11" x 3.7" x 12.2" (279 x 94 x 310 mm)
Weight	5.1 lbs. (2.27 kg)

Accessories

One Year Warranty

SUPPLIED: BNC to BNC cable, 50Ω Terminator & Instruction Manual, Line Cord
OPTIONAL: BNC to BNC cables, CC 41A

4MHz Function Generators

4001A

4003A

4MHz Sweep Function Generator Model 4001A

Models 4001A and 4003A are 4MHz Sweep Function Generators. The sweep function offers linear or log sweep with variable sweep rates and widths. The model 4003A has the addition of a 60MHz five digit external frequency counter.

Common Features

- **Generates Sine, Triangle & Square waveforms from 0.5Hz to 4MHz**
- **20Vpp output into open circuit (10Vpp into 50Ω)**
- **TTL Output <25nS**
- **100% DC offset**
- **Variable amplitude output plus 20dB attenuator**

4003A Additional Features

- **CMOS adjustable level output**
- **5 digit LED display**
- **Voltage Control Generator (VCG) input**

Specifications

model

	4003A
COUNTER	
Display	5 digit 0.36 Red LED display with Autorange
Gate Time	Auto Select (0.25S~10S)
Resolution	0.001Hz
MODE	INT Function Generator/EXT Counter
Accuracy	± time Base Accuracy ± 1 count
Time Base	20MHz (+ 10PPM)
Frequency Range	0.2Hz~60MHz
Sensitivity	25mVrms at 1MHz
Max Input	250Vrms
Input Impedance	1MΩ +2%

4MHz Function Generator with 5 Digit Red LED Model 4003A

Specifications

models

	4001A	4003A
MAIN OUTPUT		
Frequency Range	0.5Hz to 4MHz in 6 Ranges	
Waveforms	6 Waveforms (Sine, Square, Triangle, Ramp, +Pulse, -Pulse)	
Amplitude	20Vp-p in to a Open (10Vp-p in to 50W)	
Attenuater	0dB, -20db (+2%)	
Output Impedance	50W (+2%)	
DC Offset	+10V (pull ADJ.)	
Distortion	<2%, 1Hz to 100KHz	
Rise/Fall Time	<90nS (20Vp-p, No Load)	
V.C.F. Input	0 to +10V control	
SYNC OUTPUT		
Rise Time	<40nS (Into 50Ω)	
Level	>3Vp-p (open)	
Waveforms	Pulse	
SWEEP		
Mode	Linear/Log Sweep	
Width	>100:1 Continuously Variable	
Rate	From 10mS to 5S Continuously Variable	
Sweep Output	10Vp-p (open)	
Output Impedance	1KW +2%	
Power Source	AC 115VAC/230VAC +10%, 50/60Hz, 25W	
Dimensions (H x W x D)	10.83" x 3.6" x 11.8" (275 x 90 x 300mm)	
Weight Approx.	4.9lbs (2.2kg)	5.5lbs (2.5kg)

Accessories

One Year Warranty

SUPPLIED: Instruction Manual & BNC Cable CC-21, Line Cord
OPTIONAL: TLFG Kit, CC-41A Cable.

Signal Generator

10MHz Handheld Sine & Square Wave Signal Generator Model 3003

Model 3003 Hand-held 10MHz Sine & Square Wave Generator is a small size and lightweight portable Signal Generator that makes it practical for use where a traditional sized meter may be too cumbersome. Model 3003 has a frequency accuracy of 0.02% with 0.1Hz stability making it ideal for use by schools, research & development departments, hobbyists, and field test technicians.

The Model 3003 offers the user an outstanding list of features including:

- **Low Cost**
- **Small Size (2.1" x 3.6" x 6.0")**
- **Light Weight (0.80 lbs. without battery)**
- **Produces clean sine and square waves**
- **Variable amplitude control for sine wave**
- **Eight push wheel switches to set frequency**
- **External AC adapter (6V – 9VDC, 150mA, 6.5mm x 2.1mm center pin +), or one standard 9V battery**
- **0.1Hz stability**
- **Low battery indicator**

The Model 3003 Signal Generator is a cost-effective signal source. Its architecture is based upon the latest advances in signal generation technology. The model 3003 delivers clean and accurate DC to 10MHz waveforms with frequency accuracy of 0.02% and 0.1Hz frequency resolution. Eight (8) push wheel switches enable the user to quickly and easily set the frequency.

Optional Accessory

BNC Cable CC-21

Specifications

model 3003

Frequency Characteristics	
Waveforms	Sine, Square
Range	DC to 9.9999999MHz, 0.1Hz steps
Accuracy	0.02%
Sine Wave Output	0 – 4.5Vp-p (no load) Variable amplitude control
Output impedance	50 Ω
Square Wave Output	5Vp-p (no load)
Duty Cycle	50% typical
Output impedance	50 Ω
Power	An external AC adapter (6V - 9V DC 150mA 5.5mm x 2.1mm center pin+) or one 9V battery
Dimensions	1.5" x 3.8" x 5.7" (38 x 97 x 145 mm)
Weight	2 lbs. (0.9 kg)

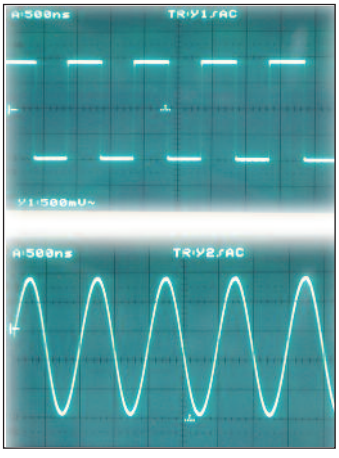
Accessories

One Year Warranty

SUPPLIED: User Manual & AC Adapter
OPTIONAL: BNC Cable CC-21

Square wave

Sine wave



TEL. (714) 921-9095, FAX (714) 921-6422

RF / Audio Generators

3001

20 Hz-150 kHz Sine/Square Wave Audio Generator
Model 3001

- **Sine and square wave generator**
- **20 Hz to 150 kHz in 46 steps**
- **Low distortion R-C oscillator**
- **Variable output control**
- **Compact, fully portable, light weight**
- **Low battery indicator**

Specifications

model	3001
Frequency Range	x1 range 20 Hz to 1.5 kHz (23 steps), x100 range 2 kHz to 150 kHz (23 steps)
Accuracy	20 Hz through 100 kHz (±3% or less), 120 kHz and 150 kHz (±5% or less)
Output Control	0dB/-20dB attenuator switch and variable amplitude control
Output impedance	approx. 600Ω
SINEWAVE CHARACTERISTICS	
Output Voltage	>1.2V rms at max. setting (no load)
Output Flatness	(Short term) 20 Hz to 150 kHz ±0.5dB (reference frequency 1 kHz)
Distortion	200 Hz—15kHz 0.5% (THD) or less, 50 Hz—28 kHz 0.1% (THD) or less, 20 Hz—100kHz 0.3% (THD) or less
SQUARE WAVE CHARACTERISTICS	
Output Voltage	> 5V p-p at maximum setting
Rise and Fall Time	Less than 0.5microseconds
Sag	Less than 5% at 20 Hz (DC coupled)
Over Shoot	<2% from maximum output, to 50mV p-p
Duty Ratio	50% +5%
SYNC OUTPUT CHARACTERISTICS	
Output Voltage	>1.2V rms (no load)
Output Impedance	1kΩ +5%
Other specifications same as sinewave characteristics	
GENERAL INFORMATION	
Operating Temperature	0°C to +50°C; specifications apply from 10°C to 30°C, <80% R.H.
Storage Temperature	-20°C to +60°C, without battery
Power Requirements	9V battery NEDA 1604A
Battery Life	35 hours typical with Alkaline
Battery Indicator	LED indicates low battery
Dimensions (HxWxD)	6 x 3.3 x 0.9" (150 x 82 x 21mm)
Weight	7 oz. (200 g) including battery

Accessories

One Year Warranty

SUPPLIED: Two standard banana plug to insulated clip test leads, 9V battery, manual
OPTIONAL: TL 5A, CC 130

2005B

150 MHz RF Signal Generator
Model 2005B

- **100 kHz to 150 MHz on six bands**
- **Output to 450 MHz on harmonics**
- **AM modulation, internal or external**
- **Frequency monitor output for external frequency counter**
- **Step and variable attenuation**

Specifications

model	2005B
MAIN OUTPUT	
Frequency Range	100 kHz to 150 MHz (up to 450 MHz on third harmonics) A) 100 kHz-300 kHz B) 300 kHz-1 MHz C) 1 MHz-3.2 MHz D) 3 MHz-10 MHz E) 10 MHz-35 MHz F) 32 MHz-150MHz (96-450 MHz on harmonics)
Dial Accuracy	±3%
RF Output Level	Continuously variable. Step attenuator provides approximately 20 dB of attenuation
Maximum Output	Approximately 100 mV rms to 35 MHz. Continuously variable in hi or lo step, at least 20 dB range of adjustment
FREQUENCY MONITOR OUTPUT	
Frequency	100 kHz to 150 MHz
Level	50 mV rms min. fixed, unmodulated signal
AMPLITUDE MODULATION	
Internal	Frequency 1 kHz; level continuously variable. Modulation signal available at front panel jack; fixed 1 V rms (min) into approx. 10 kΩ
External	Frequency 50 Hz to 20 kHz
Sensitivity	Approximately 100 mV rms
POWER SOURCE	120/220/240V ±10%, 50/60 Hz
GENERAL	
Dimensions (HxWxD)	5.91 x 9.84 x 5.12" (150 x 250 x 130 mm)
Weight	5.5 lbs. (2.5 kg)

Accessories

One Year Warranty

SUPPLIED: BNC to Insulated Clip Output Cable, Detachable Power Cord, Manual
OPTIONAL: CC-21

Digital Multimeters & Clamp-On Meters

SELECTION GUIDE

	DCV Accuracy (%)	Display Count	Analog Bar Graph	Auto/Manual Ranging	Manual Ranging	True RMS	Min/Max Hold	Peak Hold	Data Hold	Memory	Capacitance	Frequency	Logic Level	Transistor Gain (hFE)	Temperature	Relative Mode	dBm Measurement	Max. Current Range (Amps)	Transient & Overload Protection	Battery Life (Hours)	Auto Power Off	Drop Resistant Case	Water Resistant	Rubber Boot	Model	Catalog Page
Test Bench®	0.5	3999			√			√			√	√	√	√				20	√	200	√	√			388B	58-59
	0.25	3999	√	√			√		√	√	√	√				√		20	√	200	√	√	√		389A	
	0.1	3999	√	√			√		√	√	√	√			√	√		20	√	200	√	√			390A	
	0.05	19999			√	√			√			√	√					20	√	200	√	√	√		391A	
Survivor®	0.5	1999			√													20	√	250	√	√	√	√	2860A	55
Dual Display RS-232	0.06	51000	√	√		√	√	√	√		√	√						10		80				√	2880B	56-57
	0.06	51000	√	√		√	√	√	√		√	√			√	√	√	10		80				√	2890A	
Tool Kit®	0.5	1999			√						√							10	√	200		√		√	2703B	60-61
	0.5	1999			√						√	√		√				10	√	200		√		√	2704B	
	0.5	1999			√						√	√		√	√			10	√	200		√		√	2706A	
	0.5	1999			√						√	√	√	√				10	√	200		√		√	2707A	
Mini-Pro®	2.0	1999			√													10		200					2405A	62-63
	1.2	3200	√	√														10		200					2407A	
	2.0	1999			√													10		200					2408	

TEL. (714) 921-9095, FAX (714) 921-6422

SELECTION GUIDE

	DCV Accuracy (%)	Display Count	Analog Bar Graph	Auto/Manual Ranging	Manual Ranging	True RMS	Min/Max Hold	Peak Hold	Data Hold	Capacitance	Frequency	Logic Level	Relative Mode	dBm Measurement	Max. Current Range (Amps)	Transient & Overload Protection	Battery Life (Hours)	Auto Power Off	Model	Catalog Page
Bench	0.02	50,000		√		√	√		√		√		√	√	20				**5491A**	
	0.012	120,000		√		√	√		√		√		√	√	20				**5492**	**66-67**
	0.1	20,000		√		√									20	√			**2831D**	**65**
Clamp-On	1.0	10000		√				√	√						100		45	√	**316**	
	N/A	2000		√					√						600		1000	√	**312B**	
	1.0	10000		√				√	√						600		50	√	**313A**	**70**
	1.0	3999	√	√		√	√	√	√		√				600	√	200	√	**325**	
	0.5	2000							√						1000		500		**330B**	
	0.5	3200	√					√	√		√				1000		500	√	**350B**	
	0.8	2000						√	√						2000		150		**367A**	**68-69**
	0.5	4000	√			√	√	√	√	√	√		√		1000		500	√	**369B**	
Analog	3%											√		√	12		200		**114B**	**71**
	5%														0.25		200		**117B**	
Pocket	1.3	3200	√	√					√		√				N/A	√	250	√	**2700**	**64**

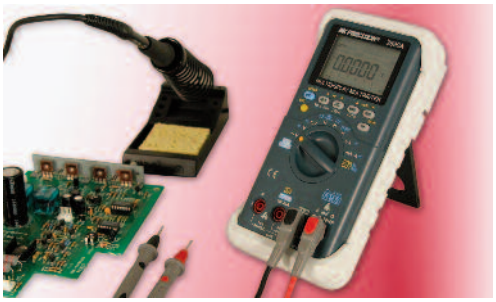
For the right DMM please see our Multimeter Selection Tool on the Web - www.bkprecision.com

AC/DC Milliamp Clamp Meter

Measures Current Levels More Than 10X Lower Than Traditional Sized Meters

Model 316 portable, battery-powered AC/DC milliamp clamp meter measures current levels more than ten times lower than tradional sized meters, which can only measures current levels down to around five amps. Designed for evaluating and repairing electronic equipment, it is suited for applications where a traditional sized meter may be too cumbersome to use

Multimeters



Multimeter Use

Multimeters are test instruments designed to perform more than one test parameter.
A basic multimeter provides three measurements:

- Voltage (AC and DC)
- Resistance (in ohms)
- Current (AC and DC)

Multimeters may also include other test parameters such as:

- Continuity
- Diode test
- Capacitance measurement
- Frequency measurement
- dBm measurement
- Transistor gain (hFE)
- Logic level

You need to review the complete test parameters for the multimeter you are considering.
The selection chart on page 52-53 provides a quick reference for this information.

Digital vs. Analog

You will notice that there are many digital multimeters on the market from which to make a selection.

What's the difference?

A digital display meter shows you a direct reading of the measurement being made. You do not have to make an interpretation of the reading.
An analog display meter is sometimes called a "swing needle" meter. As a measurement is being made, you have to see where the needle sets and then make an interpretation of the scale under the needle. Sometimes "parallax" (side viewing of the meter scale) may cause a misinterpretation of the meter reading. A mirrored scale on the analog meter solves this problem to some extent.
Analog meters have advantages by showing an "instant" change in reading. Due to the sampling rate of digital meters, change in reading may not be picked up as quickly. A solution to this problem was found by including an analog bargraph on a digital display meter. Some digital meters have this "analog" feature in them. Again, check the selection chart on page 52-53 for this information.

Accuracy and Resolution

If your accuracy requirements are critical for design or service, you need a high accuracy, high resolution meter. If your measurements are general purpose in nature, such as just checking voltages or continuity of a wire, an average meter (0.5% - DC volt accuracy) would fit your needs. No one but you will know the accuracy required for your measurement.

What is True RMS?

With the amount of non-sinusoidal power on AC power lines caused by uneven loads (motor controllers, personal computers, fax machines, computer printers, fax) you need a True RMS meter to make accurate measurements of AC Voltage or current. Some meters also include selectable AC or AC & DC True RMS measurements which provide the most complete accuracy measurements.

Ruggedized Construction

Some meters are used in the relatively calm environment of the test bench, while other meters' fate is in the real world of field service, plant maintenance, and MRO. You can select from any DMM series - ruggedized, water resistant meters

Budget considerations

B+K Precision offers a complete range of multimeters that will meet your testing, accuracy and budget parameters. Answer these questions:

Where will you be using the meter?

(on the bench, in the field, or both)

What type of measurements will you be making? (consider present and future needs)

What kind of accuracy will you require?

(consider present and future needs)

Review the selection chart on page 52-53 for a preliminary selection. Then turn to the specific model number page for complete specifications.

Survivor® Multimeter

HIGH ENERGY FUSED

The "Survivor" name says it all!

Excellent meters for most jobs that require flexibility, accuracy and speed. Value packed features make these meters a must in every Tool Kit.

Model 2860A

- **Heavy Duty 1500 VDC rating**
- **Ruggedized construction**
- **Includes rubber boot**
- **Withstands 5-foot drop**
- **Extra large, high contrast LCD display**
- **Gasket sealed against dirt and contaminant**
- **Water resistant**
- **High energy fused on all current ranges**
- **Auto power off saves batteries**
- **Built in probe holders**
- **Non-slip grip**
- **Extensive overload protection**
- **0.5% DCV accuracy**
- **Manual ranging**
- **3 1/2 digit, 2000 count**
- **Large 0.8" LCD display**

Specifications

model	2860A
DC Volts	Manual ranging
Ranges	200mV, 2V, 20V, 200V, 1500V
Resolution	100µV, 1mV, 10mV, 100mV, 1V
Accuracy	±(0.5% rdg + 1 dgt)
Overload protection	1500V peak
Input Impedance	10MΩ
AC Volts	Manual ranging avg. responding, rms reading
Ranges	200mV, 2V, 20V, 200V, 1000V
Resolution	100µV, 1mV, 10mV, 100mV, 1V
Accuracy	±(1.25% rdg + 4 dgt)
Frequency Response	40Hz - 500Hz
Overload Protection	1500V peak
Input Impedance	10MΩ
Current	Manual ranging AC avg. responding, rms reading
Ranges	200µA, 2mA, 20mA, 200mA, 20A*
Resolution	0.1µA, 1µA, 10µA, 100µA, 10mA
Accuracy (DC)	±(1.0% rdg + 1 dgt), ±(2.0% rdg + 3 dgt) for 20A
Accuracy (AC)	±(1.5% rdg + 3 dgt), ±(2.5% rdg + 4 dgt) for 20A
Frequency Response	40Hz-500Hz
Overload Protection	High energy 600V, 1A full for µA/mA, High energy 600V, 15A for 20A
Resistance	Manual ranging
Ranges	200Ω, 2kΩ, 20kΩ, 200kΩ, 2MΩ, 20MΩ
Resolution	0.1Ω, 1Ω, 10Ω, 100Ω, 1kΩ, 10kΩ
Accuracy	±(0.75% rdg + 1 dgt) ±(1.5% rdg + 5 dgt) for 20MΩ
Overload Protection	600V peak
Diode Check	Tested at 1.5mA, 3.3V max typical tested at 1mA 3.2V max typical
Continuity	Beeper sounds below 100Ω approx.
Display	0.8" LCD, 1999 count
Sampling rate	2.5 /sec.
Operating Temperature	32° to 122°F (0°C to 50°C), <80% RH
Power	Single 9V battery
Battery life	250 hrs type (alkaline)
Auto power off	Approx. 30 min.
DImensions (H x W x D)	6.88 x 3.5 x 1.5" (175 x 89 x 38mm)
Weight	12 oz. (353g)

Accessories

Five Year Warranty

SUPPLIED: Battery, test leads, rubber holster, manual
OPTIONAL: TL 1 Replacement Test Leads , TL 2A Deluxe Test Leads, TL 3 Accessory TIp Kit (for TL 2A), TL 130A General Purpose DMM Kit, PR 28A High Voltage Probe, CP 3 AC/DC Current Clamp Adapter, Carrying Case (not included): LC 29B

*10 A continuous, 20A for 30 seconds max.

Dual Display 51,000 Count Multimeters

2880B

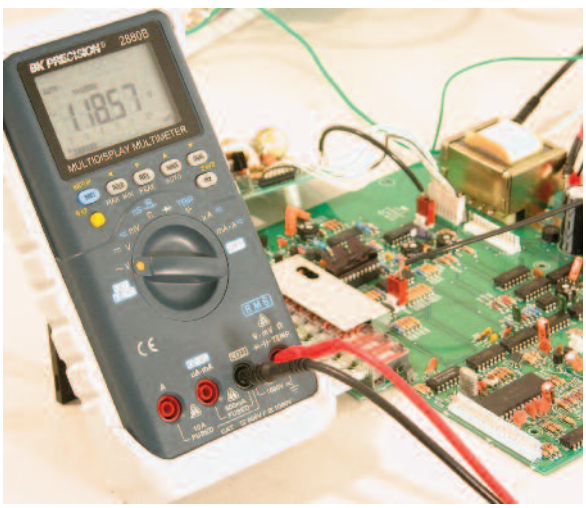
2890A

Dual Display 51,000 Count DMM Models 2880B & 2890A

Model 2890A is a Dual Display 51,000 Count DMMs with exceptional accuracy and functionality. It offers superb performance with many features that are useful for trouble shooting electronic and electrical circuits or to test and evaluate circuits in a field service application.

Common Features:

- **True RMS ACV and ACA**
- **AC+DC True RMS (2890A only)**
- **5 Digit LCD for both the primary and secondary displays**
- **21 Segment analog bar graph**
- **Automatic polarity indicator**
- **0.025% Basic DCV accuracy (0.03% for 2880B)**
- **Resistance measurements**
- **Conductance measurements up to 50nS with 0.01nS resolution**
- **Capacitance measurement**
- **Frequency with ACV measurement**
- **Data Hold**
- **dBm Measurement**
- **REL Mode**
- **1ms Peak Hold for glitch capture**
- **Back lit LCD (2890A only)**
- **Frequency counter up to 20MHz (2890A only)**
- **Square Wave output with 28 frequency ranges and adjustable duty cycle (2890A only)**
- **Conforms to IEC-1010-1 600V CAT III and 1000V CAT II**
- **CE Approved**



Electronic Circuit Trouble Shooting

Easy to Understand Interface

IEC Rated Inputs

Back Lit LCD (2890A only)

Square Wave Output (2890A only)

TEL. (714) 921-9095, FAX (714) 921-6422

Display 51,000 Count Multimeters

New DMM Test kits Contains Most Commonly Requested Accessories

2880BKIT

B&K Precision Corporation's new Model 2880BKIT and 2890AKIT DMM Test Kits are the latest additions to its growing line of test and measurement instruments. The new kits combine B+K's most popular DMM's with the most commonly requested accessories for each model. B+K has taken the guesswork out of ordering these meters and accessories. Now, the user can have all of the tools ready upon receipt to take full advantage of either meters capability. The new DMM kits offer versatility and reliability for a broad spectrum of applications, while providing a significant cost savings over individual component pricing. B+K Precision's new DMM kits are the ideal tools to get the job done quickly and economically. These value-packed meter kits are a must for every electronic professional.

For more information on these kits see page 72 or go to www.bkprecision.com

2890AKIT

Specifications

models

	2880B	2890A
DC Volts		
Ranges	50 mV, 500 mV, 1000mV, 5V, 50V, 500V, 1000V	
Resolution	1 uV, 10 uV, 0.1 mV, 0.1 mV, 1 mV, 10 mV, 0.1V	
Accuracy	+-(0.05% rdg + 50 dgt), +-(0.03% rdg + 5 dgt)	
Overload protection	600VDC/1200V peak	
Input Impedance	10 MΩ (1000 MΩ for 50 mV and 500 mV ranges)	
AC Volts		
Ranges	50 mV, 500 mV, 1000mV, 5V, 50V, 500V, 750V	
Resolution	1 uV, 10 uV, 0.1 mV, 0.1 mV, 1 mV, 10 mV, 0.1V	
Accuracy (Basic AC)	±(0.6% rdg + 25 dgt)	
Frequency Response	30 Hz to 30 kHz	
Overload Protection	1200 VDC or 850 VAC rms (600 VDC or AC to 500 mV range)	
Input Impedance	10 MΩ	
Current		
Ranges	500uA, 5 mA, 50 mA, 500 mA, 5A, 10A	
Resolution	10 nA, 0.1 uA, 1 uA, 10 uA, 0.1 mA, 1 mA	
Accuracy (Basic DC)	±(0.1% rdg + 5 dgt)	
Accuracy (Basic AC)	±(0.8% rdg + 20 dgt)	
Frequency Response	30 Hz to 30 kHz	
Overload Protection	10A continuous	
Resistance/Conductance		
Ranges	500Ω , 5 kΩ, 50 kΩ, 500 kΩ, 5 MΩ, 50 MΩ, 500MΩ(model 2890A), 500nS	
Resolution	0.01Ω , 0.1 Ω, 1 Ω, 10 Ω, 1 kΩ, 1 kΩ, 0.01nS	
Accuracy (Basic)	±(0.8% rdg + 5 dgt)	
Overload Protection	600VDC, AC rms	
Frequency	Does not apply	±0.02% +3dgt
Frequency Counter	Does not apply	±0.002% +5dgt
Square Wave Output	Does not apply	±0.005% +2dgt
Diode Check		
Range	Diode	
Resolution	0.1mV	
Accuracy	±(0.05% rdg + 5 dgt)	
Test Current	Approx. 1.0mA	
Open Voltage	<+4.8V DC	
Overload Protection	1000V RMS for the circuits<0.3A short circuit	
Continuity	Buzzer threshold: sounds below 100 mΩ	
Display	5 digit LCD with 21 segment analog bargraph and automatic polarity indication	
Operating Temperature	32° F to 122° F (0° C to + 50° C), <= 80% RH	
Power	Single 9V battery	
Battery life	80 hrs typ (alkaline)	
Auto power off	Approx. 10 min.	
Dimensions (HxWxD)	7.56x3.55x1.46 (192x90x37 mm)	
Weight (approx)	2 lbs. (936g)	

Accessories

Three Year Warranty

SUPPLIED: Battery, test leads, holster, manual
OPTIONAL: AK 2880B Communication Package, TL-50 Maxi-Pro DMM Kit, TL 130A General Purpose DMM Kit, TP-A Temperature Adapter, Temperature Probes, Carrying Case (not included): LC 29B
NOTE: For more detailed specifications, please use specifications in the downloadable instruction manual.

Test Bench® High Performance DMM

391A 390A 389A 388B

Models 388B, 389A, 390A & 391A

High performance and value priced, the Test Bench® Series offers more features for the dollar than other multimeters. These meters include Component Test capabilities, Resistance, Diode Test and Capacitance, in addition to measuring Frequency, Temperature and a Logic Indicator. See the chart below for the meter that best fits your needs. Dual injection molding process allows a better grip and protection for the meters. CE marked and UL listed.

Common Features

HIGH ENERGY FUSED

- **Resistance measurement**
- **Diode check**
- **Frequency measurement**
- **Audible continuity**
- **All current ranges fused**
- **Ruggedized case**
- **Auto power off**
- **Designed to meet IEC61010-1 CATIII 1000V, class 2**

High Quality, Ruggedized, Multifunction

Features

	models 391A	390A	389A	388B
Basic Functions				
True RMS	√			
Ranging	Manual	Auto/Manual	Auto/Manual	Manual
DCV Accuracy	0.05%	0.1%	0.25%	0.5%
AC/DC Voltage and Current	√	√	√	√
Display Digits, Count	4 1/2, 20000	3 3/4, 4000	3 3/4, 4000	3 3/4, 4000
Bar Graph (41 Segment)		√	√	
Capacitance Measurement		√	√	√
Transistor Test				√
Temperature Probe		√		
Logic Probe	√			√
Relative Mode		√	√	
Min/Max Hold		√	√	
Peak Hold		√	√	
Data Hold	√	√	√	
RS-232		√		

Specifications

	models 391A	390A	389A	388B
Volts	True RMS reading			
DC Ranges	200mV, 2V, 20V, 200V, 1,000V	400mv, 4V, 40V, 400V, 1000V		
AC Ranges	200mV, 2V, 20V, 200V, 750V	400mv, 4V, 40V, 400V, 750V		
Resolution	10μV, 100mV, 1 mV 10mV, 100mV	100μV, 1mV, 10mV, 100mV, 1V		
DC Accuracy	±(0.05% + 3 dgt)	±(0.1% rdg + 2 dgt)	±(0.25% rdg + 2 dgt)	±(0.5% rdg + 1 dgt)
AC Accuracy	±(1% +10 dgt.) 50Hz-500Hz	400mV: ±(1.2% rdg+ 5 dgt)		±(1.2% rdg+ 4 dgt)
	±(2% + 10 dgt.) 500Hz - 2kHz,	50Hz-100Hz		750V: ±(2% rdg+ 4 dgt)
	500Hz on 750Vrange	±(1.0% rdg + 3 dgt) 50Hz-500Hz	>10% of range at 200mV range	±(1.5% rdg + 3 dgt) 500Hz-1kHz
Overload Protection	1200VDC or AC rms	1100VDC or AC rms		1200VDC or AC rms
	500VDC/AC rms 15 sec			500VDC/AC rms 15 sec
	on 200mV range			on 200mV range
Input Impedance	10MΩ	400mV: >100MΩ, 4V: 10MΩ,	40V - 1000V: 9.1MΩ	10MΩ

New Kits (for more information see page 72)

Model 388BKIT is ideal for general purpose electronic and electrical trouble shooting or repair. Kit contains flexible pincer and alligator clips for larger components and miniature hook clips for smaller ones.

Model 391AKIT is the perfect kit for anyone testing or measuring electronic circuits. Kit includes spring-load tip miniature probes for testing those micro-sized circuits.

Specifications (continued)

models

	391A	390A	389A	388B
Current	True RMS reading			
Ranges	200µA, 2mA, 20mA, 200mA, 20A*	400µA, 4mA, 40mA, 400mA, 20A*		400mA, 4mA, 40mA, 400mA, 2A, 20A*
Resolution	10nA, 100nA, 1µA, 10µA, 1mA	0.1µA, 1µA, 10µA, 100µA, 10µA		100nA, 1µA, 10µA,100µA,1mA,10mA
DC Accuracy	200µA to200mA:±(0.5% rdg + 5 dgt.) 20A: ±(2% rdg + 10 dgt.)	400µA - 400mA:±(1% rdg + 5dgt) 20A: ±(2% rdg + 3 dgt)	±(1% rdg + 1 dgt) ±(2% rdg + 3dgt)	400µA - 400mA: ±(1% rdg + 1 dgt) 2A: ±(1.5% rdg + 1 dgt) 20A: ±(3% rdg + 3 dgt)
AC Accuracy	200µA to200mA:±(1.2% rdg + 10 dgt.) 20A: ±(2.5% rdg + 20 dgt.)	400µA to 400mA:±(1.5% rdg + 4 dgt) 20A: ±(2.5% rdg + 4 dgt.)		400µA - 400mA:±(1.5% rdg + 1 dgt) 2A: ±(2% rdg + 4 dgt) 20A: ±(3.5% rdg + 4 dgt)
Input Protection	µA/mA input: 0.5A/500V fast blow ceramic fuse 20A input: 20A/600A fast blow ceramic fuse	µA/mA input: 0.5A/500V fast blow ceramic fuse 20A input: 20A/600A fast blow ceramic fuse		µA/mA input: 2A/600V fast blow ceramic fuse 20A input: 20A/600V fast blow ceramic fuse
Max. Burden Voltage	600mV (900mV on 20A range)	500mV (2V on 4mA, 400mA ranges)		600mV (900mV on 2A, 20A ranges)
Resistance				
Ranges	200Ω; 2kΩ, 20kΩ, 200kΩ; 2MΩ, 20MΩ	400Ω, 4kΩ, 40kΩ, 400kΩ, 4MΩ, 40MΩ		
Resolution	10mΩ, 100mΩ, 1Ω, 10Ω, 100Ω, 1kΩ	100mΩ, 1Ω, 10Ω, 100Ω, 1kΩ, 10kΩ		
Accuracy	200Ω, 2MΩ: ±(0.25% rdg + 10 dgt.) 2kΩ to 200kΩ: ±(0.15% rdg + 3 dgt.) 20MΩ: ±(1.0% + 10 dgt.)	400Ω to 400kΩ: ±(0.5% rdg + 4 dgt.) 4MΩ: ±(1% rdg + 5 dgt.) 40MΩ: ±(2% rdg + 5 dgt.)		400Ω: ±(1% rdg + 4 dgt.) 4kΩ to 4MΩ: ±(0.8% rdg + 4 dgt.) 40MΩ: ±(2% rdg + 5 dgt.)
Open Circuit Voltage	3.2VDC typ.	-0.45VDC typ. (-1.2VDC on 400Ω range)		0.6VDC typ. (3.2VDC on 400Ω range)
Overload Protection		500VDC or ACrms		
Diode Test	Tested at 1mA, 3.2VDC max. type. ±(1% rdg + 10 dgt.) accuracy	Tested at 1.2mA, 3.0VDC max. type. ±(1.5% rdg + 3 dgt.) accuracy		Tested at 1mA, 3.2VDC max. type. ±(1.5% rdg + 3 dgt.) accuracy
Transistor Test (hFE)	Does not apply	Does not apply		hFE range: 0 - 1000 hFE base current: 10µADC
Capacitance				
Ranges	Does not apply	4nF, 40nF, 400nF, 4µF, 40µF, 400µF, 4mF, 40mF		4nF, 40nF, 400nF, 4µF, 40µF
Resolution		1pF, 10pF, 100pF, 1nF, 10nF, 100nF, 1µF, 10µF		0.1pF, 1pF, 10pF, 100pF, 1nF
Accuracy		4nF: ±(3% rdg + 20 dgt.) 4nF to 40µF: ±(3% rdg + 5 dgt.) 400µFto 40mF: ±(5% rdg + 10 dgt.)		±(3% rdg + 4 dgt.)
Test Voltage		<1V		<3.5V
Overload Protection		500VDC or AC rms		
Frequency				
Ranges	2kHz, 20kHz, 200kHz	4kHz, 40kHz, 400kHz, 4MHz, 40MHz		4kHz, 40kHz, 400kHz, 4MHz
Resolution	0.1 Hz, 1Hz, 10Hz	1Hz, 10Hz, 100Hz, 10kHz, 100kHz		1Hz, 10Hz, 100Hz, 10kHz
Accuracy	±(0.1% rdg + 3 dgt.)	±(0.1% rdg + 3 dgt.)	±(0.25% + 4 Digits)	±(0.1% + 2 Digits)
Sensitivity	50mVrms min. (@>30 & <70% duty cycle: 400mVrms min.)	1Hz - 4MHz: 1Vrms 4MHz - 40MHz: >2Vrms, <5Vrms		250mVrms min. on 10Hz to 1MHz 500mVrms min. on 1MHz to 4MHz
Minimum Pulse Width	>25ns	>25ns		>2µs
Duty Cycle Limits	>30% & <70%	>30% & <70%		
Minimum Input Range	2kHz:10Hz:20kHz:>60dgt; 200kHz>60dgt			
Overload Protection		500VDC or AC rms		
Logic Test		Does not apply	Does not apply	
Logic Threshold	Hi=2.8±0.8V, 0=0.8 ± 0.5V			Hi=2.8±0.8V, 0=0.8 ± 0.5V
Frequency Response	20MHz			20MHz
Pulse Width	25ns			25ns
Pulse Limits	>20% and <80%			>20% and <80%
Indication	40m sec beep at logic 1 (Hi)			40m sec beep at logic 1 (Hi)
Overload Protection	500V DC or ACrms			500V DC or ACrms
Temperature	Does not apply		Does not apply	Does not apply
Range, Resolution		-58° to +2372°F, 1F° (-50°to + 1300°C, 1C°)		
Accuracy		±(0.8% rdg + 2°C) -50° - 400°C ±(1% rdg + 2°C) 400° - 1300°C		
Duty Cycle		Does not apply	Does not apply	Does not apply
Range, Resolution	0 to 90%, 0.1%			
Accuracy (5V logic)	±(2.0% rdg + 10 dgt.)			
Minimum Pulse Width	10µs			
Frequency Range	40Hz to 20kHz			
Overload Protection	500VDC or AC rms			
General				
Display	20000 count, 4 1/2 digit LCD	4000 count, 3 3/4 digit LCD with 41 segment analog bar graph		4000 count, 3 3/4 digit LCD
Polarity	Automatic, positive implied, negative polarity indication			
Operating Temperature	32° to 122° (0° to 50°C), 0 to 70% R.H.			
Dimensions (HxWxD)	7.8 x 3.5 x 1.57" (198 x 90 x 40mm)			
Weight	11.3 oz. (320g).			

Accessories

Three Year Warranty

SUPPLIED: 9 Volt Battery, Test Leads, Instruction Manual, Thermocouple Probe (Model 390A), Software and Interface Cable (Model 390A)
OPTIONAL: TL 2A Deluxe Test Leads, TL 3 Accessory Tip Kit (for TL 2A), PR 28A High Voltage Probe (40kVDC),
TL 130A General Purpose DMM Kit, TL-50 Maxi-Pro DMM Kit, Carrying Case (not included): LC 29B

*10 A continuous, 20A for 30 seconds max.

Tool Kit® Multimeters

Models 2703B, 2704B 2706A, & 2707A

Excellent meters for most jobs that require flexibility, accuracy and speed. Value packed features make these meters a must in every "Tool Kit®."

2703B

2704B

Common Features:

- **2000 count**
- **0.5% DCV accuracy**
- **DC voltage to 1000V**
- **AC voltage to 750V**
- **DC current to 10A**
- **Continuity**
- **Diode test**
- **Drop resistant case**

Features

	models 2707A	2706A	2704B	2703B
Basic Functions				
Ranging	Manual	Manual	Manual	Manual
Current	10A AC/DC	10A AC/DC	10A AC/DC	10A DC
Component Tests				
Resistance	0.1Ω to 200MΩ	0.1Ω to 20MΩ	0.1Ω to 20MΩ	0.1Ω to 20MΩ
Capacitance	to 20μF	to 20μF	to 20μF	
Transistor Test	√	√	√	
Frequency Counter	√	√	√	
Temperature Probe		√		
Logic Probe	√			

Specifications

	models 2707A	2706A	2704B	2703B
DC Volts				
Ranges	200mV, 2V, 20V, 200V, 1000V			
Resolution	100μV, 1mV, 10mV, 100mV, 1V			
Accuracy	±(0.5% + 1 Digit)			
Overload Protection	200mV Range 500V DC + AC Peak, 350V RMS Sine: All Other Ranges: 1200V DC + AC Peak, 800V RMS, Sine			
Input Impedance	10MΩ			
AC Volts				
Ranges	200mV, 2V, 20V, 200V, 750V			200V, 750V,
Resolution	100μV, 1mV, 10mV, 100mV, 1V			100mV, 1V
Basic Accuracy	±(0.5% + 1 Digit)			
Frequency Response	50 to 500 Hz			
Overload Protection	200mV Range: 500V DC + AC Peak, 350V RMS, Sine All Other Ranges: 1200V DC + AC Peak, 800V RMS, Sine			
Input Impedance	10MΩ			4.5MΩ
DC Current				
Ranges	200μA, 2mA, 20mA, 200mA, 2A, 10A (2A: 2706A only)		200mA, 20mA, 200mA, 10A	
Resolution	0.1μA, 1μA, 10μA, 100μA, 1mA, 10mA (1mA: 2706A only)		0.1μA, 1μA, 100μA, 10mA	
Accuracy	±(1% + 1 Digit): 10A Range: ±(2% + 3 Digits)			
Burden Voltage	10A and 200mA range: 750mV max.; All Other Ranges: 325mV max.			
Overload Protection	10A Range: Unfused; All Other Ranges: 250V Fuse			
AC Current				
Ranges	200μA, 2mA, 20mA, 200mA, 2A, 10A (2A: 2706A only)			Does not apply
Resolution	0.1μA, 1μA, 10μA, 100μA, 1mA, 10mA (1mA: 2706A only)			Does not apply
Accuracy	±(1.2% + 4 Digits): 10A Range: ±(2% + 4 Digits)			Does not apply
Frequency Response	50 to 500 Hz			Does not apply
Burden Voltage	10A and 200mA Range: 750mV max.; All Other Ranges: 325mV max.			Does not apply
Overload Protection	10A Range: Unfused; All Other Ranges: 0.63A/ 250V Fuse			Does not apply
Resistance				
Ranges	200Ω, 2kΩ, 20kΩ, 200kΩ, 2MΩ, 20MΩ, 200MΩ (200MΩ: 2707A only)			
Resolution	0.1Ω, 1Ω, 10Ω, 100Ω, 1kΩ, 10kΩ, 100kΩ (100kΩ: 2707A only)			
Basic Accuracy	200MΩ Range (2707A only): ±(5% + 10 Dgt.); ±(0.8% + 1 Digit)			
	20MΩ Range: ±(3% + 1 Digit)	43MΩ Range: ±(1.5% + 4 Digit)		200Ω Range: ±(1% + 3 D)
Overload Protection	500V DC + AC Peak			

TEL. (714) 921-9095, FAX (714) 921-6422

Tool Kit® Multimeters

2706A

2707A

Specifications (continued)

models

	2707A	2706A	2704B	2703B
Diode Test	Tested at 1.6mA and 3.2V Max.			Does not apply
Transistor Test (hFE)	Base Current: 10μA Vce; 2.8V; Gain Indication: 0 to 1,000			Does not apply
Capacitance				Does not apply
Ranges	2,000pF, 20nF, 200nF, 2μF, 20μF			
Resolution	1pF, 10pF, 100pF, 1nF, 10nF			
Accuracy	±(3% + 10 Digits)			
Test Frequency, Voltage	400Hz, 50mV			
Frequency				Does not apply
Ranges	2kHz, 20kHz, 200kHz, 2MHz, 15MHz			
Resolution	1Hz, 10Hz, 100Hz, 1KHz, 10KHz			
Accuracy	±(0.1% + 2 Digit)			
Sensitivity	1Vrms			
Overload Protection	500V DC + AC Peak			
Logic Probe (TTL)		Does not apply	Does not apply	Does not apply
Logic Threshold	1 = 2.8 ± 0.8V, 0 = 0.8 ± 0.5V			
Minimum Pulse Width	25nS			
Input Impedance	120kΩ nom.			
Overload Protection	500V DC + AC Peak			
Temperature	Does not apply		Does not apply	Does not apply
Range		-4° to + 1400°F (-20° to + 750°C)		
Accuracy	Does not apply		Does not apply	Does not apply
-4° to + 900°F (-20° to 500°C)		±(2% + 4°F) ±(2% + 2°C)		
900° to + 1400°F (500° to + 750°C)		±(3% + 4°F) ±(3% + 2°C)		
Continuity Tone	Tone Sounds within 100mS for Resistance Under 100Ω			
General				
Display	3 1/2 digit, high-contrast 0.7" LCD, 1999 counts			
Sampling	3 times/sec. (nominal)			
Operating Temp:	32° to 104°F (0° to + 40°C), 0 to 70% RH			
Storage Temp	-4° to 140°F (-20° to + 60°C), 0 to 80% RH			
Power Requirements	9 Volt NEDA 1604.			
Battery Life	200 hours (alkaline) nominal 275 hours (alkaline) Nominal (2703B only)			
Dimensions (HxWxD)	5.9 x 3.1 x 1.3" (150 x 79 x 33 mm)			
Weight	9 oz. (250g) with battery			

Accessories

One Year Warranty

SUPPLIED:Battery, Test Leads, Instruction Manual.Thermocouple Probe (2706A only)
OPTIONAL:TL 2A Deluxe Test Leads, TL 3 Accessory Tip Kit (for TL 2A), PR 28A High Voltage DMM Probe (40kVDC),
TL 130A General Purpose DMM Kit, Carrying Case (not included): LC 29B

New Kit (for more information see page 72)

Model 2704BKIT - This kit includes a perfect introduction meter and accessories. Basic starter leads for everyday use.

Mini-Pro® Multimeters

2405A

2407A

2408

Non-Contact Voltage Indicator. Light and sound denote the presence of AC voltage from 70V to 480VAC @50 - 60Hz. This eliminates the need for an extra tool to carry in your tool box.

Models 2405A, 2407A & 2408

Reliable, Durable & Multi-Function

The Mini-Pro® multimeters are a professional quality multimeter at low cost. Three new meters with a price point that will put them in every toolbox and field service kit. The unique design fits easily in the palm of your hand and CE approval ensures safe operation. Manual and autoranging models offer the basic functionality needed to do 90% of most required testing.
These meters are the best value for any hobbies. No home should be without one!

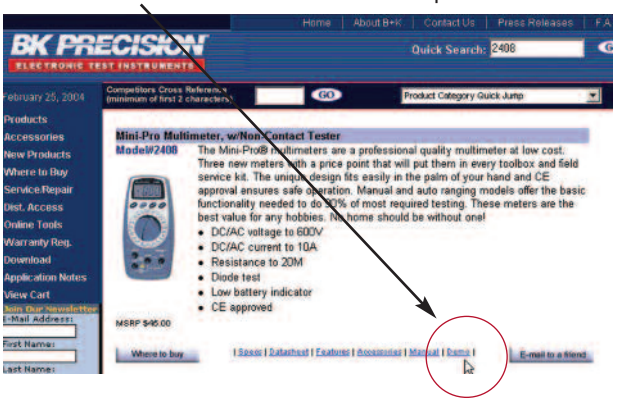
Common Features:

- **DC/ACvoltage to 600V**
- **DC current to 10A**
- **Resistance to 20MΩ (model 2407A 31MΩ)**
- **Diode test**
- **Low battery indicator**
- **CE approved**

Features — models

	2405A	2407A	2408
Basic Functions			
Display Counts	2000	3200	2000
Basic DC Accuracy	2.0%	1.2%	1.2%
Ranging	Manual	Auto	Manual
Current	10A DC	10A AC/DC	10A AC/DC
1.5V & 9V Battery Test	√		
Auto Zeroing	√		√
Bar Graph		√	
Auto Power Off		√	
Continuity		√	√
Data Hold		√	√
Max. Hold			√
Non-contact Voltage Indicator			√

For more information about the voltage detector please see our demo video on the Web - www.bkprecision.com



40KV High Voltage Probe Meter

Model HV-44A

The HV-44A is a self-contained instrument that measures high DC voltages up to +40KV. This probe is typically used to measure high voltages in TV sets, power supplies, laboratories and for general high voltage commercial applications.

Specifications — model

	HV-44A
Voltage range	0 to +40KV DC
Input Impedance	600MΩ, nominal
Accuracy	±3% of full scale.
Calibration	Internal, factory calibrated at 25KV
Size	16.5 x 2.125 x 2" with a 34" long ground cord (419 x 54 x 50mm with a 86.4cm long ground cord)
Probe Tips	Two interchangeable tips; one round needle type, one special flat spring type for easy access to CRT anode.

One Year Warranty

TEL. (714) 921-9095, FAX (714) 921-6422

Mini-Pro® Multimeters

Specifications

models

	2405A	2408	2407A
DC VOLTS	Manual Ranging		Auto/Manual ranging
Ranges	2V, 20V, 200V, 600V	200mV, 2V, 20V, 600V	320mV, 3.2V, 32V, 320V, 600V
Resolutions	1mV, 10mV, 100mV, 1V	100µV, 1mV, 10mV, 1V	100µV, 1mV, 10mV, 100mV, 1V
Basic Accuracy	±(2%rdg+1dgt)	±(1.2%rdg+1dgt)	±(1.2%rdg+1dgt)
Overvoltage Protection	600V, DC + AC Peak	600V, DC + AC Peak	600V, DC + AC Peak
Input Impedance	10MΩ	10MΩ	10MΩ, 1GΩ (320mV range only)
AC VOLTS	Manual ranging, average responding, rms reading		Auto/Manual ranging, average responding, rms reading
Ranges	200V, 600V	200mV, 2V, 20V, 600V	3.2V, 32V, 320V, 600V
Resolutions	100mV, 1V	100µV, 1mV, 10mV, 1V	1mV, 10mV, 100mV, 1V
Basic Accuracy	±(2.9%rdg+4dgt), 50Hz-500Hz	±(2%rdg+1dgt), 50Hz-500Hz	±(1.5%rdg+4dgt), 50/60Hz
Input Impedance	10MΩ	10MΩ	10MΩ
DC CURRENT	Manual ranging		Auto/Manual ranging
Ranges	200µA, 2mA, 20mA, 200mA, 10A*	2mA, 20mA, 200mA, 10A*	320µA, 3200µA, 32mA, 320mA, 10A*
Resolutions	0.1µA, 10µA, 100µA, 10mA	0.1µA, 10µA, 100µA, 10mA	0.1µA, 1µA, 10µA, 100µA, 10mA
Basic Accuracy	±(3.0%rdg+ dgt)	±(1.5%rdg+1dgt), ±(3.0%rdg+1dgt) for 20A	±(2.0%rdg+4dgt,±3.0%rdg+1dgt) fro 20A
Overload protection	0.8A, 250V fuse; 10A, 600V fused	0.8A, 250V fuse; 10A, 600V fused	0.5A, 250V fuse; 10A, 600V fused
*10A on for 30 seconds maximum, off for 3 minutes minimum.			
AC CURRENT	Does not apply	Manual ranging	Auto/Manual ranging
Ranges		200µA, 20mA, 200mA, 10A	320µA, 3200µA, 32mA, 320mA, 10A*
Resolutions		0.1µA, 10µA, 100µA, 10mA	0.1µA, 1µA, 10µA, 100µA, 10mA
Accuracy		±(2.0%rdg+4dgt) for 10A	±(2.5%rdg+4dgt) 50/60Hz
		±(3.5%rdg+4dgt)	±(3.5%rdg+1dgt) 50.60Hz for 20A
Overload protection	0.5A, 250V fuse, 10A, 600V		
*10A on for 30 seconds maximum, off for 3 minutes minimum.			
RESISTANCE	Manual ranging		Auto/Manual ranging
Ranges	200Ω, 2kΩ, 20kΩ, 200kΩ, 20MΩ	200Ω, 20kΩ, 200kΩ, 20MΩ	320Ω, 3.2kΩ, 31kΩ, 310kΩ, 3.1MΩ, 31MΩ
Resolutions	100mΩ, 1Ω, 10Ω, 100Ω, 1kΩ	100mΩ, 10Ω, 100Ω, 10kΩ	100mΩ, 1Ω, 10Ω, 100Ω, 1kΩ, 10kΩ
Accuracy	±(2%rdg+3dgt)	±(1.5%rdg+4dgt), ±(3.0%rdg+4dgt) for 20MΩ	±(1.0%rdg+3dgt), ±(1.5%rdg+2dgt) for 3.1MΩ
		±(5.0%rdg+5dgt) for 31MΩ	
Open circuit voltage	approx. 0.3VDC	approx. 0.3VDC	approx. 1.5VDC
Overload protection	500V DC + AC Peak	500V DC + AC Peak	500V DC + AC Peak
DIODE CHECK			
Resolution	1mV	1mV	1mV
Accuracy	±(3%rdg+3dgt)	±(2.0%rdg+1dgt)	±(10%rdg+3dgt)
Open Circuit Voltage	3VDC Type.	3VDC Type.	<3.5VDC
Test Current (approximate)	1.0mA ±0.6mA	1.0mA	1.0mA ±0.6mA
Overload protection	500V DC + AC Peak	500V DC + AC Peak	500V DC + AC Peak
Measures forward voltage drop of diode or semiconductor junction in mV.			
CONTINUITY CHECK	Does not apply		
Buzzer Threshold		<100Ω	<320Ω
Overload protection		500V DC + AC Peak	500V DC+AC Peak
Battery Test	1.5V, 9V	Does not apply	Does not apply
Non-Contact Voltage Indicator	Does not apply	Detect voltages from 70V to 480VAC	Does not apply
		50Hz - 60Hz	
Display	2000 count, 3 1/2 digit 0.53" LCD	2000 count, 3 1/2 digit 0.53" LCD	3200 count, 3 1/2 digit 0.4" LCD
		with 32 segment analog bargraph	
Polarity	Automatic, (-) negative polarity indication		
Overrange Indication	"OL" or "-OL" is displayed		
Measurement Rate	2.5 samples per second	2.5 samples per second	2 samples per second
Low Battery Indication	Symbol Displayed		
Operating Temperature	32° to 122°F(0° to + 50°C), <70% R.H		
Storage Temperature	-4° to 140°F(-20° to + 60°C), <70% R.H, battery removed		
Power	Single standard 9V battery, NEDA 1604 or equivalent		
Battery Life	200 hours typical (alkaline)		
Dimensions (HxWxD)	5.63 x 2.25 x 1.375" (143 x 68 x 47mm)		
Weight	7.27 oz. (206g)		

Accessories

One Year Warranty

SUPPLIED: Battery, Test Leads, Instruction Manual

OPTIONAL: TL 2A Deluxe Test Leads, TL 3 Accessory Tip Kit (for TL 2A), TL 130A General Purpose DMM Kit, Carrying Case (not included): LC 24

Non-Contact ACV Detectors with Flashlight

SenseLite

AC Voltage Detector
Detects AC Voltage from 40VAC to 300VAC

Water Resistant

No Lithium Battery
Uses Standard Alkaline AAA Battery

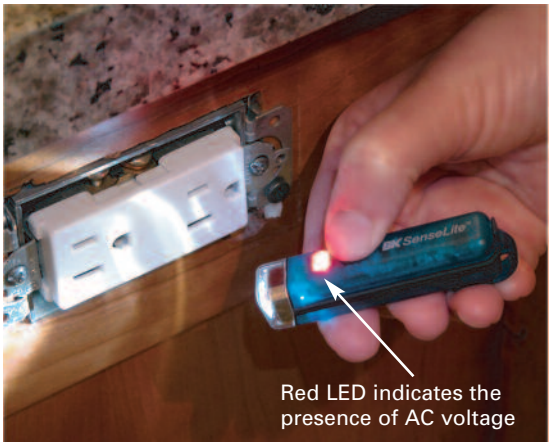
Long Battery Life

100,000hr Bulb
Ultra-Bright White LED

Pocket DMM with Bargraph Model 2700

- **Analog bargraph**
- **3200 count display**
- **Auto power off**
- **Range Hold**
- **Data Hold**

2700



Specifications

model

	2700
DC VOLTS	Auto/Manual ranging
Ranges	300mV, 3V, 30V, 300V, 450V
Resolutions	100μV, 1mV, 10mV, 100mV, 1V
Basic Accuracy	±(1.3%rdg+2dgt)
Overvoltage Protection	500V, DC + AC Peak
Input Impedance	10MΩ
AC VOLTS	Auto/Manual ranging, average responding, rms reading
Ranges	3V, 30V, 300V, 450V
Resolutions	1mV, 10mV, 100mV, 1V
Accuracy	±(2.3%rdg+5dgt)
Input Impedance	10MΩ
RESISTANCE	Auto/Manual ranging
Ranges	300Ω, 3kΩ, 30kΩ, 300kΩ, 3MΩ, 30MΩ
Resolutions	100mΩ, 1Ω, 10Ω, 100Ω, 1kΩ, 10kΩ
Basic Accuracy	±(2.0%rdg+3dgt), ±(6%rdg+3dgt) for 3.1MΩ, 10% for 30MΩ
Open circuit voltage	approx. 1.3VDC
Overload protection	500V DC + AC Peak
CONTINUITY CHECK	
Range	300Ω
Buzzer Threshold	<20Ω
Overload protection	500V DC+AC Peak
Battery Drain	No
Display	3200 count LCD with 32 segment analog bargraph
Polarity	(-) negative polarity indication
Overrange Indication	"OL" displayed
Low Battery Indication	"B" displayed
Operating Temperature	32° to 104°F (0° to 40°C), <70% RH
Storage Temperature	-4° tp +140°F (-20° to +60°C)
Power	Two 1.5V button type batteries NEDA 1166A or equivalent
Battery Life	250 hours
Dimensions (HxWxD):	4.4 x 2.2 x 0.4" (112 x 56 x 11 mm)
Weight	3 oz. (86 g) with batteries

Accessories

One Year Warranty

Batteries, Instruction manual, Case

SenseLite™

AC Voltage Detector and LED Pocket Flashlight

The SenseLite™ is fully functional, high intensity, battery powered flashlight with a non-contact AC voltage detection circuit and red LED indicator. This compact, lightweight, portable, battery-powered unit is a hand-held and it is used to illuminate the work area when tracing AC circuits in dark areas or behind equipment. The SenseLite™ is a "must-have" addition to every toolbox.

B+K Precision's SenseLite™ high intensity pocket flashlight can be used to detect the presence of AC voltage at a socket, switch or wire. Simply place the flashlight near the area to be tested and press the power button. If there is an AC voltage present, the red LED will shine brightly.

B+K Precision's SenseLite™ offers a number of outstanding features including:

- **AC Voltage Detection (detects AC voltage from 40VAC to 300VAC)**
- **Water Resistant**
- **Long Battery Life**
- **No Lithium Battery, uses standard Alkaline AAA Battery**
- **100,000 hr Bulb.**

In addition to detecting the presence of AC voltage, B+K Precision's SenseLite™ is a fully functional, adjustable, high intensity LED flashlight that can be placed on a key chain or in a glove compartment for everyday use. The pure white light produced by SenseLite™ is also ideal for camping, boating, and any activity that requires night vision in true color.

Measuring a compact 0.63" wide x .083" high x 2.8" long (1.6cm x 2.1cm x 7.2cm) and weighing only 0.9oz including battery, the SenseLite™ is powered by a standard alkaline AAA battery

4 1/2 Digit True RMS
Model 2831D

The model 2831D provides versatility and reliability for a broad spectrum of laboratory and service applications. Being a true Multimeter it can make diode, frequency and continuity measurements in addition to basic current, voltage and resistance measurements.

- **True RMS for accurate interpretation of any waveform signal**
- **4 1/2 Digit LED display for clear reading in darkest environment**
- **Great overload protection on all ranges**
- **Voltage measurements up to 1200VDC and 1000VAC**
- **Current measurements up to 20A AC/DC**
- **Basic accuracy for DCV is 0.05%**

Extremely versatile, B+K Precision's new Model 2831D True RMS Bench Multimeter features an easy-to-read, front-panel-mounted 4 1/2 digit LED display. The AC/DC voltage range is 2V,20V, 200V and 1200VDC/1000VAC, with a best resolution of 1uV. The 2831D can measure up to 12A maximum of AC and DC current, and measures frequencies to 1MHz.

Specifications

model	2831D
DC Volts	
Ranges	200mV, 2V, 20V, 200V, 1200V
Resolution	0.1mV, 1mV, 10mV, 100mV, 1V
Basic Accuracy	0.05% + 5 digit
Input Impedance	10MΩ
AC Volts	
Ranges	200mV, 2V, 20V, 200V, 750V
Resolution	same as DCV
Basic Accuracy	0.75% + 4 digits
Input Impedance	10 MΩ <100pF
True RMS	Yes
DC Current	
Ranges	2mA, 20mA, 200mA, 2000mA, 20A
Resolution	100nA, 1μA, 10μA, 100μA, 1mA, 10mA
Basic Accuracy	0.75% + 5 digit
Overload Protection	2A/250V fuse & 20A unfused
AC Current	
Ranges	2mA, 20mA, 200mA, 2000mA, 20A
Resolution	100nA, 1μA, 10μA, 100μA, 1mA, 10mA
Basic Accuracy	1.5% rdg + 10 digits
Overload Protection	Same as DC
Resistance	
Ranges	4200Ω, 2kΩ, 20kΩ, 200kΩ, 2000kΩ, 20MΩ
Resolution	00.1Ω, 1Ω, 10Ω, 100Ω, 1kΩ, 10kΩ
Basic accuracy	0.2% rdg + 6 digit
Frequency	
Range	20KHz & 200KHz
Accuracy	±1.5% +5 digit, ±2.0%+5digit
Sensitivity	4Vp-p
Diode Test	1mA test current
Continuity Check	Audio tone for resistance under <200Ω
General	
Display	4-1/2 digit LCD, 0.5 inch LED
Power	120/240 VAC, 50/60 Hz (5W)
Operating Temperature	32° to 104°F (0° to40°C), 70% RH
Size (HxWxD)	3.5 x 9.4 x 10.6" (90 x 240 x 270mm)
Weight	4.6 lbs (2.1 kg)

Accessories

One Year Warranty

SUPPLIED: Instruction Manual, Test Leads, AC Power Cord
OPTIONAL: TL 1 Replacement Test Leads , TL 2A Deluxe Test Leads, TL 3 Accessory TIp Kit (for TL 2A), TL 130A General Purpose DMM Kit, PR 28A High Voltage Probe, CP 3 AC/DC Current Clamp Adapter TL-50 Maxi-Pro DMM Kit

Dual Display Bench Multimeters

5491A

5492

50,000 Count Digit Dual Display Model 5491A

The new PC-Compatible benchtop unit provides an easy to read dual display with 50,000 count accuracy. Model 5491A offers a very accurate, feature packed True RMS bench DMM at a very reasonable price. Because of its low price and high accuracy, Model 5491A is an ideal tool for use in any high school, technical trade school, college and university laboratory, as well as Research & Development, Service, Maintenance, Test and Manufacturing benchtop applications.

- **Low cost and high performance**
- **True RMS (AC, AC + DC)**
- **Resistance measurements up to 50MΩ**
- **Measures frequency to 500KHz**
- **dBm measurement**
- **RS 232 Interface**

5 1/2 Digits Dual Display Model 5492

The Dual Display Multimeter model 5492 is a 5 1/2 digit multimeters with selectable count resolutions up to 120,000 count. It is designed for bench-top, field service, and system applications with a high performance to price ratio.

- **Selectable 120,000 / 40,000 / 4,000 Count**
- **Dual Display**
- **True RMS (AC, AC+DC), 40Hz to 30KHz Measurement Bandwidth**
- **2 or 4 wire selectable for Resistance Measurements**
- **MIN/MAX**
- **Selectable measurement rates**
- **Data Hold**
- **RS 232 interface**
- **GPIB version available (model 5492GPIB)**

Specifications

models

	5491A	5492
DC Voltage Ranges		
Slow Sampling Rate	N/A	120mV, 1.2V, 12V, 120V, 1000V
Resolution	--	1uV, 10uV, 100uV, 1mV, 10mV
Accuracy ±	N/A	0.02% + 8dgt
Medium Sampling Rate	500mV, 5V, 50V, 500V, 1000V	400mV, 4V, 40V, 400V, 1000V
Resolution	10uV, 100uV, 1mV, 10mV, 100mV	10uV, 100uV, 1mV, 10mV, 10mV, 100mV
Accuracy ±	0.02% + 4dgt	0.02% + 5dgt
Fast Sampling Rate	--	400mV, 4V, 40V, 400V, 1000V
Resolution	--	100uV, 1mV, 10mV, 100mV, 1V
Accuracy ±	--	0.02% + 2dgt
AC Voltage (True RMS, AC Coupling Mode)		
Slow Sampling Rate	N/A	120mV, 1.2V, 12V, 120V, 750V
Resolution		1uV, 10uV, 100uV, 1mV, 10mV
Accuracy ±		1% + 100dgt (20 - 45Hz)
		0.2% + 100dgt (45 - 10kHz)
		1.5% + 300dgt (10k - 30kHz)
		5% + 300dgt (30k - 100kHz)
Medium Sampling Rate	500mV, 5V, 50V, 500V, 750V	400mV, 4V, 40V, 400V, 750V
Resolution	10uV, 100uV, 1mV, 10mV, 100mV	10uV, 100uV, 1mV, 10mV, 100mV
Accuracy ±	1% + 40dgt (30 - 50Hz)	1% + 40dgt (20 - 45Hz)
	0.5% + 40dgt (50 - 10kHz)	0.2% + 40dgt (45 - 10kHz)
	2% + 120dgt (10k - 30kHz)	1.5% + 80dgt (10k - 30kHz)
	3% + 120dgt (30k - 100kHz)	5% + 120dgt (30k - 100kHz)
Fast Sampling Rate	N/A	400mV, 4V, 40V, 400V, 750V
Resolution		100uV, 1mV, 10mV, 100mV, 1V
Accuracy ±		1% + 5dgt (20 - 45Hz)
		0.2% + 5dgt (45 - 10kHz)
		1.5% +10dgt (10k - 30kHz)
		5% + 15dgt (30k -100kHz)
AC Voltage (True RMS, AC+DC Coupling Mode)		
Slow Sampling Rate	N/A	120mV, 1.2V, 12V, 120V, 750V
Resolution		1uV, 10uV, 100uV, 1mV, 10mV
Accuracy ±		0.2% + 100dgt (45 - 10kHz)
		1.5% + 300dgt (10k - 30kHz)
		5% + 300Dgt (30k - 100kHz)
Medium Sampling Rate	500mV, 5V, 50V, 500V, 750V	400mV, 4V, 40V, 400V, 750V
Resolution	10uV, 100uV, 1mV, 10mV, 100mV	10uV, 100uV, 1mV, 10mV, 100mV
Accuracy ±	0.5% + 50dgt (50 - 10kHz)	0.2% + 45dgt (45 - 10kHz)
	2% + 70dgt (10k - 30kHz)	1.5% + 300dgt (10k - 30kHz)
	3% + 130dgt (30k - 100kHz)	5% + 300Dgt (30k - 100kHz)
Fast Sampling Rate	N/A	400mV, 4V, 40V, 400V, 750V
Resolution		100uV, 1mV, 10mV, 100mV, 1V
Accuracy ±		0.2% + 7dgt (45 - 10kHz)
		1.5% + 12dgt (10k - 30kHz)
		5% + 18dgt (30k - 100kHz)
DC Current		
Slow Sampling Rate	N/A	12mA, 120mA, 1200mA, 12A
Resolution		0.1uA, 1uA, 10uA, 100uA
Accuracy ±		0.05% + 15dgt
Medium Sampling Rate	500uA,5mA,50mA,500mA,5A,10A	40mA, 120mA, 1200mA, 12A
Resolution	10nA,100nA,1uA,10uA,100uA1mA	1uA, 10uA, 100uA, 1mA
Accuracy ±	0.05% + 5dgt	0.1% + 6dgt
Fast Sampling Rate	N/A	40mA, 120mA, 1200mA, 12A
Resolution		10uA, 100uA, 1mA, 10mA
Accuracy ±		0.1% + 2dgt

Dual Display Bench Multimeters

Specifications (Continued)

models

	5491A	5492
AC Current (True RMS, AC Coupling Mode)		
Slow Sampling Rate		12mA, 120mA, 1200mA, 12A
Resolution		0.1uA, 1uA, 10uA, 100uA
Accuracy ±		1.5% + 100dgt (20 - 50Hz)
		0.5% + 100dgt (45 - 2kHz)
		2% + 200dgt (2k - 10kHz)
Medium Sampling Rate	500uA, 5mA, 50mA, 500mA	40mA, 120mA, 1200mA, 12A
Resolution	10nA, 100nA, 1uA, 10uA,	1uA, 10uA, 100uA, 1mA
Accuracy ±	1.5% + 50dgt (30 - 50Hz)	1.5% + 40dgt (20 - 45Hz)
	0.5% + 20dgt (50 - 2kHz)	0.5% + 40dgt (45 - 2kHz0
	1.5% + 50dgt (2k - 5kHz)	2% + 80dgt (2k - 10kHz)
	3% + 75dgt (5K - 20KHz)	N/A
Fast Sampling Rate		40mA, 120mA, 1200mA, 12A
Resolution		10uA, 100uA, 1mA, 10mA
Accuracy ±		1.5% + 5dgt (20 - 40Hz)
		0.5% + 5dgt (45 - 2kHz)
		2% + 10dgt (2k - 10kHz)
Ac Current (True RMS, AC+DC Coupling Mode)		
Slow Sampling Rate		12mA, 120mA, 1200mA, 12A
Resolution		0.1uA, 1uA, 10uA, 100uA
Accuracy ±		0.5% + 100dgt (45 - 2kHz)
		2% +200dgt (45 - 2kHz)
Medium Sampling Rate	500uA, 5mA, 50mA, 500mA	40mA, 120mA, 1200mA, 12A
Resolution	10nA, 100nA, 1uA, 10uA	1uA, 10uA, 100uA, 1mA
Accuracy ±	0.5% + 30dgt (50 - 2kHz)	0.5% + 42dgt (45 - 2kHz)
	1.5% + 60dgt (2k - 5kHz)	2% + 80 (2k - 10kHz)
	3% + 85dgt (5K - 20KHz)	N/A
Fast Sampling Rate	N/A	40mA, 120mA, 1200mA, 12A
Resolution		10uA, 100uA, 1mA, 10mA
Accuracy		0.5% + 7dgt (45 - 2kHz)
		2% + 12dgt (2k - 10kHz)
Resistance (2-wireΩ and 4-wireΩ)		
Slow Sampling Rate	N/A	(1.2k, 12k, 120k, 1.2M, 12M, 120M)Ω
Resolution		1mΩ, 10mΩ, 100mΩ, 1Ω, 10Ω, 100Ω, 1kΩ
Accuracy ±		0.1% +8dgt (2-wire)
		0.05% + 8dgt (4-wire)
Medium Sampling Rate	500Ω, 5KΩ, 50KΩ, 500KΩ, 5MΩ, 50MΩ	(400, 4k, 40k, 400k, 4M, 40M, 300M)Ω
Resolution	10mΩ, 100mΩ, 1Ω, 10Ω, 100Ω, 1kΩ	10mΩ, 100mΩ, 1Ω, 10Ω, 100Ω, 1kΩ, 10kΩ
Accuracy ±	0.1% + 5 (500Ω range)	0.1% + 2dgt (2-wire)
	0.1% + 3 (other range)	0.05% + 5dgt (4-wire)
Fast Sampling Rate	N/A	(400, 4k, 40k, 400k, 4M, 40M, 300M)Ω
Resolution		100mΩ, 1Ω, 10Ω, 100Ω, 1kΩ, 10kΩ, 100kΩ
Accuracy ±		0.1% + 2dgt (2-wire)
		0.05% + 2dgt (4-wire)

General Specifications

Warm Up time	At least 30 minutes
Temperature Coefficient	Add 0.15 x (the applicable Accuracy ±)/°C to 18°C and 28°C to 50°C
Operating Temperature	0°C to 50°C (32°F to 122°F)
Storage Temperature	-20°C to 60°C (-4°F to 140°F)
Line Voltage	100V, 120V, 220V, 240V AC +-10%, 50/60Hz, 16VA maximum
Interface	RS-232
Dimensions (HxWxD)	4.13" x 10" x 12" (105 x 255 x 305)mm
Weight	6.6 lbs. (3.0 kgs)

Accessories

One Year Warranty

SUPPLIED: Instruction Manual & Test Leads
OPTIONAL: TL 2A, TL 3, TL 130A GP DMM Kit, TL-50 Maxi-Pro DMM kit, AK 5491 Software and RS-232 Cable, KC 01 4 Wire Test Leads with Kelvin Clips, RK 01 Rack Mount, TH 02 Insulation Piercing Clips.

Specifications (Continued)

models

	5491A	5492
DIODE TEST/CONTINUITY		
Slow Sampling Rate		
Maximum Reading	--	1.19999V
Resolution	N/A	10uV
Medium Sampling Rate	--	--
Maximum Reading	2.3000V	2.4999V
Resolution	100uV	100uV
Fast Sampling Rate	N/A	
Maximum Reading	--	2.499V
Resolution	--	1mV
Resistance/Continuity		
Slow Sampling Rate	N/A	120Ω
Resolution	--	1mΩ
Accuracy ±	--	0.1% + 8dgt
Medium Sampling Rate	500Ω, 5KΩ, 50KΩ, 500KΩ 5MΩ, 50MΩ	400Ω
Resolution	10mΩ, 100mΩ 1Ω, 10Ω 100Ω, 1KΩ	10mΩ
Accuracy ±		0.1% + 5dgt
Fast Sampling Rate		400Ω
Resolution		100mΩ
Accuracy ±		0.1% + 2dgt
Frequency		
Range (Hz)	500, 5k, 50K, 500k	1200, 12k, 120k, 1M
Resolution (Hz)	0.01, 0.1, 1, 10	10m, 100m, 1, 10
Accuracy ± (Hz)	0.01% +5dgt at 500Hz range	0.005% + 3dgt

5 1/2 Digits Dual Display Model 5492GPIB

The Dual Display Multimeter model 5492GPIB has the same specifications as model 5492 with addition of GPIB interface.

Clamp-On Multimeters

Models 330B, 350B 367A, 369B

B+K Precision offers a wide variety of current clamps for safe non-invasive current measurement. Measure up to 2000A with these reliable, rugged instruments. All of B+K Precision clamps are much more than a current clamp offering the ability to measure, voltage resistance, capacitance and even frequency. Additionally, special features allow for the recording of minimum and maximum values, peak values, test diodes and for continuity. Any one of these products can be a total measurement solution.

369B
True RMS

367A

350B

330B

- **Measures up to 2000A**
- **Measures up to 1000V**
- **Jaw openings 2.24" (Models 330B, 350B 369B)**
- **Low battery indication**
- **Accessories Supplied: Battery, Test Leads, Instruction Manual, Carrying Case**

Features

models

	369B	367A	350B	330B
AC Current	1000A	2000A	1000A	1000A
DC Current	1000A	2000A		
AC Voltage	750V	750V	750V	750V
DC Voltage	1000V	1000V	1000V	1000V
Resistance	40MΩ	40MΩ	30MΩ	2000MΩ
Frequency	√	√	√	--
Capacitance	√	√	--	--
True RMS	√	√	--	--
Continuity	√	√	√	√
Diode	√	√	√	√
Count Resolution	4000	4000	3200	2000
Bargraph	√	√	√	--
Data Hold	√	√	√	√
Peak Hold	√	√	√	
Max Hold	--	--	--	√
Range Hold	√	√	√	--
Max/Min	√	√	--	--
Relative	√	√	--	--
Auto Off	30 min.	30 min.	10 min.	--

Specifications

models

	369B	367A	350B	330B
AC Current (using Clamp)				
Ranges	400A, 1000A	400A, 2000A	32A, 320A, 1000A	200A, 1000A
Resolution	100mA, 1A	100mA, 1A	10mA, 100mA, 1A	100mA, 1A
Accuracy (50-60 Hz)	±(1.5% rdg + 5D)	±(1.5% rdg + 5D)	±(1.5% rdg + 5D)	±(1.5% rdg + 5D)
Overload Protection	1200A	1200A	1200A	1200A
DC Current (using Clamp)			Does not apply	Does not apply
Range	400A, 1000A	400A, 2000A		
Resolution	100mA, 1A	100mA, 1A		
Accuracy	±(1.5% rdg + 5D)	±(1.5% rdg + 5D)		
Overload Protection	1200A	1200A		

Clamp-On Multimeters

Specifications

models

	369B	367A	350B	330B
AC Voltage (using test leads)				
Range	400mV, 4V, 40V, 400V, 750V	400mV, 4V, 40V, 400V, 750V	320mV, 3.2V, 32V, 320V, 750V	750V
Resolution	100µV, 1mV, 10mV, 100mV, 1V	100µV, 1mV, 10mV, 100mV, 1V	100µV, 1mV, 10mV, 100mV, 1V	1V
Basic Accuracy	±(1.5% rdg + 4D)	±(1.5% rdg + 4D)	±(1.5% rdg + 4D)	±(1.2% rdg + 5D)
Overload Protection	1000V DC/750 V RMS	1000V DC /750V RMS	1000V DC /750V RMS	1000V DC /750V RMS
Input Impedance	10 MΩ	10 MΩ	10 MΩ	4.5 MΩ
DC Voltage (using test leads)				
Range	400mV, 4V, 40V, 400V, 1000V	400mV, 4V, 40V, 400V, 1000V	320mV, 3.2V, 32V, 320V, 1000V	1000V
Resolution	100µV, 1mV, 10mV, 100mV, 1V	100µV, 1mV, 10mV, 100mV, 1V	100µV, 1mV, 10mV, 100mV, 1V	1V
Basic Accuracy	±(0.5% rdg + 1D)	±(0.5% rdg +1D)	±(0.5% rdg + 1D)	±(0.5% rdg + 1D)
Overload Protection	1000V DC/750V RMS	1000V DC/750V RMS	1000V DC/750V RMS	1000V DC/750V RMS
Input Impedance	10 MΩ	10 MΩ	10 MΩ	10MΩ
Resistance				
Range	400Ω, 4kΩ, 40kΩ, 400k, 4M 40MΩ	400Ω, 4kΩ, 40kΩ, 400k, 4M 40MΩ	320Ω, 3.2kΩ, 32kΩ, 320kΩ, 3.2MΩ, 30MΩ	200Ω, 20kΩ, 20MΩ, 2000MΩ
Resolution	0.1Ω, 1Ω, 10Ω, 100Ω,1kΩ, 10kΩ	0.1Ω, 1Ω, 10Ω 100Ω,1kΩ, 10kΩ	0.1Ω, 1Ω, 10Ω, 100Ω,1kΩ, 10kΩ	0.1Ω, 10Ω, 10kΩ, 100kΩ
Basic Accuracy	±(1% rdg + 2D)	±(1% rdg + 2D)	±(1% rdg + 3D)	±(1% rdg + 3D) 4kΩ-4MΩ:±(1% rdg + 3D) 40MΩ: ±(3% rdg + 3D)
Overload Protection	500V DC/ AC RMS	500V DC/ AC RMS	500V DC/AC RMS	500V DC/AC RMS
Frequency				Does not apply
Range	100Hz, 1kHz, 10kHz 100kHz, 400kHz	100Hz, 1kHz, 10kHz 100kHz, 400kHz	320Hz, 3.2kHz, 32kHz	
Resolution	0.01Hz, 0.1Hz, 1Hz 10Hz, 100Hz	0.01Hz, 0.1Hz, 1Hz 10Hz, 100Hz	0.1Hz, 1Hz, 10Hz	
Accuracy	±(0.5% rdg + 3D)	±(0.5% rdg + 3D)	±(1% rdg + 2D)	
Overload Protection	500V DC/AC RMS	500V DC/AC RMS	500V DC/AC RMS	
Capacitance			Does not apply	Does not apply
Range	4nF, 40nF, 400nF, 4µF, 40µF	4nF, 40nF, 400nF, 4µF, 40µF		
Resolution	1pF, 10pF, 100pF, 1nF, 10nF, 100nF	1pF, 10pF, 100pF, 1nF, 10nF, 100nF		
Accuracy	±(1.5% rdg + 4D)	±(1.5% rdg + 4D)		
Overload Protection	500V DC/AC RMS	500V DC/AC RMS		
Jaw Opening	2.24" (57mm)	2.24" (57mm)	2.24" (57mm)	2.24" (57mm)
Display	3 3/4 digit LCD, 4000 count 9999 in Frequency 42 segment bar graph	3 3/4 digit LCD, 4000 count 9999 in Frequency 42 segment bar graph	3 1/2 digit LCD 3200 count	3 3/4 digit LCD 2000 count 34 segment bar graph
Polarity	Automatic, "-" indicated	Automatic, "-" indicated		
Measure Rate	2/sec.	2/sec.	2/sec.	2.5/sec.
Overrange Indication	"OL"	"OL"	"OL"	"OL"
Operating Temperature	32° - 122°F, 70% RH (0° - 50°C)	32° - 122°F, 70% RH (0° - 50°C)	32° - 122°F, 70% R.H. (0° - 50°C)	32° - 122°F, 70% RH (0° - 50°C)
Storage Temperature	-4° - +140°F, 80% RH (-20° - +60°C)	-4° - +140°F, 80% RH (-20° - +60°C)	-4° - +140°F, 80% RH (-20° - +60°C)	-4° - +140°F, 80% RH (-20° - +60°C)
Power Requirements	One 9V battery, alkaline recommended type NEDA 1604A			
Battery Life	500 Hours	500 Hours	500 Hours	500 Hours
Dimensions	10.8 x 3.6 x 1.7" (275 x 90 x 43mm)	10.8 x 3.6 x 1.7" (275 x 90 x 43mm)	10.8 x 3.6 x 1.7" (275 x 90 x 43mm)	10.8 x 3.6 x 1.7" (275 x 90 x 43mm)
Weight	18.3oz (519g)	18.3oz (519g)	17oz. (482g)	17oz. (482g)

Accessories

One Year Warranty

SUPPLIED:Battery, Test leads, Instruction Manual, Carrying Case

OPTIONAL:TL 1 Replacement Test Leads , TL 2A Deluxe Test Leads, TL 3 Accessory TIp Kit (for TL 2A), TL 130A General Purpose DMM Kit, PR 28A High Voltage Probe, LC 33 Carrying Case

Clamp-On Multimeters

True RMS AC/DC Power Clamp Meter
Model 325

The lightweight, portable, battery-powered Clamp-On meter measures the most common AC Volts, DC Volts, and AC current needed to troubleshoot residential and small commercial electrical systems.

- **Back light 3 3/4 digits LCD with max. reading 3999, plus decimal point, unit symbol indication**
- **Auto range, Auto power off, Auto zero**
- **High speed bargraph**
- **Function keys: Max./Min. Hold, Data Hold, Trms Positive and Negative Peak Hold**
- **Test Ranges: ACV, ACA, DCV, DCA, Ω, WATT, Frequency, Continuity**
- **Jaw openings 1.37" (35mm)**

Mini AC Clamp Meter
Models 312B, 313A

- **Overload Protection**
- **Low battery indicator**
- **0.98" clamp opening size**
- **Continuity test**
- **2 times/sec sample rate**

Features

	models 313A	312B	316
AC Current	600A	200/600A	100A
DC Current	600A		100A
AC Voltage	600V	200/600V	600V
DC Voltage	600V		600V
Resistance	1KΩ	200Ω	10KΩ
Continuity	√	√	√
Data Hold	√	√	√

Milli-Amp AC/DC Clamp Meter
Model 316

B+K Precision offers a wide variety of current clamp meters for safe non-invasive current measurement.
The new milli-amp clamp meters are practical where a traditional sized meter may be too cumbersome to use. Model 316 features autoranging capabilities and is ideal for use in cramped quarters. The B+K Precision milli-amp clamp meter is more than just current clamps, it offers the ability to measure voltage and resistance. It also has the added functions of Peak Hold, Data Hold, and has a 4 digit display, these are invaluable tools when evaluating or repairing electronic equipment.

- **4 digit display**
- **Auto power off**
- **Low battery indicator**
- **Overload protection**

Specifications

	models 312B	313A	316
ACA (Autoranging)			
Range	200A, 600A	600A	10A, 80A, 100A
Resolution	0.1A, 1A	0.1A	1mA, 10mA, 10mA
Accuracy			
(50 - 60Hz)	2% + 5	2% + 10	
(50-500Hz)			3.5% + 10
DCA (Autoranging)			
Range	N/A	600A	10A, 80A, 100A
Resolution	N/A	0.1A	1mA, 10mA, 10mA
Accuracy	N/A	2.5% + 10	2.5% + 10 4.5% + 10
ACV (Autoranging)			
Range	200V, 600V	600V	600V
Resolution	0.1V, 1V	0.1V	0.1V
Accuracy			
(50 - 500Hz)	1.5% + 5	1.5% + 5	1.5% + 5
DCV (Autoranging)			
Range	N/A	600V	600V
Resolution	N/A	0.1V	0.1V
Accuracy	N/A	1% + 2	1% + 2
Resistance			
Range	200ohm	1000ohm	10kohm
Resolution	0.1ohm	0.1ohm	1ohm
Accuracy	1.9% + 3	1% + 3	1% + 3

Accessories

One Year Warranty

SUPPLIED: Instruction Manual, Batteries, Test Leads
OPTIONAL: TL 2A

Specifications

	model 325
DC Current	
Range	400A, 600A
Resolution	0.1A, 1A
Accuracy	1.5% + 5 dgt 2% + 5 dgt
AC Current (True RMS : From 10% to 100% of Range)	
Range	400A, 600A
Resolution	0.1A, 1A
Accuracy	
40 - 65Hz	2.0% + 5 dgt 2.0% + 5 dgt
65 - 1kHz	3.0% + 8 dgt 3.0% + 8 dgt
DC Voltage	
Range	400V, 600V
Resolution	0.1V, 1V
Accuracy	1.0% + 3 dgt
AC Voltage (True RMS : From 10% to 100% of Range)	
Range	400V, 600V
Resolution	0.1V, 1V
Accuracy	
40 - 400Hz	1.2% + 5 dgt
400 - 2kHz	2.0% + 5 dgt
AC + DC WATT	
Range	40KW, 400KW
Resolution	0.01KW, 0.1KW
Accuracy	5.0% + 5 dgt
Resistance	
Range	4000ohm
Resolution	1ohm
Accuracy	1.0% + 3 dgt
Frequency	
Range	4kHz, 40kHz, 400kHz
Resolution	1Hz, 10Hz, 100Hz
Accuracy	0.5% + 3 dgt

Analog Multimeters

Specifications

	models 114B	117B
DC VOLTS		
Ranges	0-300mV, 3V, 12V, 30V, 120V, 300V, 1200V	0-10V, 50V, 250V, 500V
Accuracy	±(3%rdg), full scale	±(5%rdg), full scale
Sensitivity	20000Ω/V	2000Ω/V
AC VOLTS		
Ranges	0-6V, 30V, 120V, 300V, 1200V	0-10V, 50V, 250V, 500V
Sensitivity	8000Ω/V	2000Ω/V
Accuracy	±(4%rdg), full scale @50/60Hz	±(5%rdg), full scale
Frequency response	(+1dB): 6 V range: 40 Hz to 100 kHz.	
	30 V range: 40 Hz to 50 kHz	
	120 V range: 40 Hz to 10 kHz.	
	300 V range: 40 Hz to 5 kHz	
	1200 V range: 40 Hz to 1 kHz	
DC CURRENT		
Ranges	0.6μA, 3mA, 30mA, 300mA, 12A	0-0.5mA, 50mA, 250mA
Accuracy	±(3%rdg), full scale	±(4%rdg), full scale
Burden Voltage	Less than 500mV	
RESISTANCE		
Ranges	R X 10, 0 to 20 kΩ, mid scale 200Ω	0-10kΩ/1MΩ
	R X 1k, 0 to 2 MΩ, mid scale 20 kΩ	
	R X 10k, 0 to 20 MΩ, mid scale 200 kΩ	
Resolutions		
Maximum Open		
Circuit Voltage	R X 1, X 10, X 1k ranges: 3V, R X 10k range: 12 V	
Maximum Short		
Circuit Current	R X 1 range: 150 mA R X 10 range: 15 mA, R X 1k range: 200 μA, R X 10K range: 100 μA	
Accuracy	±3% of scale arc	±5% arc of scale length
Open circuit voltage	approx. 0.3VDC	approx. 0.3VDC
Overload protection	500V DC + AC Peak	500V DC + AC Peak
dB Measurement	(dB scale)	
Range	-10 dB to +17 dB on 6 V AC range	4 dB to +56 dB on ACV range
	+4 dB to +31 dB on 30 V AC range	
	+16 dB to 43 dB on 120 V AC range	
	+24 dB to 51 dB on 300 V AC range	
	+36 dB on +63 dB on 1200 V AC range	
0 dB Reference	1 mW across 600Ω	1 mW across 600Ω
Battery Test	good-bad scale	good-bad scale
Range	1.5 V range for battery test only	1.5V and 9V
Load	7.5 ohms	
Battery Drain	200 mA	1.5V: 100mA, 9V:20mA
TRANSISTOR LEAKAGE TEST		
Ranges	0 to 150 μA on RX 1k range 0 to 15 mA on RX 10 range, 0 to 150 mA on RX 1 range	
Accuracy	±5% of scale arc	
Maximum Applied Voltage	3 V, voltage measured on LV scale	
TRANSISTOR GAIN MEASUREMENT		
Range	0 to 1,000 measured on hFE scale with range switch set to R X 10	
Accuracy	+3% of scale arc	
Display	Jeweled pivots movement, 60 μA full scale	3 color mirror scale, 180μA
Polarity	+ or -, polarity reversal switch	
Operating Temperature	32° to 104°F (0 to 40°C)	
Storage Temperature	-4° to 140°F (-20° to + 60°C), <70% R.H, battery removed	
Power	Batteries: One 9 V	Two 1.5 V AA
Battery Life	200 hours typical (alkaline)	
Dimensions (HxWxD)	5.79 x 3.9 x 1.38" (147 x 99 x 35 mm)	3.5 x 2.38 x 1.19" (89 x 60 x 30mm)
Weight	11 oz. (308 g) with batteries	11 oz.(300 g)

Accessories

One Year Warranty

SUPPLIED: Batteries, Test leads, 1 red and 1 black, Instruction manual (Model 114B)
1.5V AA Batteries, Test leads, Instruction manual (Model 117B)

Some applications still require a good old analog meter for instant measurement.

Pocket-Sized Multimeter Model 117B

- **Compact size**
- **Measures DC voltage**
- **Measures AC voltage**
- **Measures DC current**
- **Measures resistance**
- **Measures decibels**
- **9V & 1.5V battery test**

20,000 Ohms/Volt Multimeter Model 114B

- **20,000 ohms/volt DC**
- **28 ranges**
- **3 1/2" mirrored scale**
- **Tests batteries under load**
- **Tests transistors**
- **Includes batteries and test leads**

Multimeter Accessory Kits

True RMS DMM with Test Lead Set
Model 2880BKIT

This kit contains the B&K Precision model 2880B Digital Multimeter and a selected assortment of test lead accessories.
Included Test Lead Accessories

- Highly flexible silicone test leads with sheathed (shrouded) 4mm banana plugs; Right-angle for the meter, straight for the accessories, 1.5m long. Rated IEC 61010-031 1000V CAT III / 600V CAT IV to 12A
- Smooth 2mm tip probe bodies, ideal for everyday testing. Ruggedly constructed, they are rated to IEC 61010-031 1000V CAT III / 600V CAT IV to 36A.
- Flexible pincer clips for long reaches. Pincer tips can grip contact points ¬up to 0.16" diameter in either electronic or electrical applications. Rated IEC 61010-031 1000V CAT III / 600V CAT IV to 6A
- General purpose probe leads with flexible PVC jacketed wire, 2mm smooth probe tips and right angle sheathed banana plugs. Rated to IEC 61010-031 1000V CAT III / 600V CAT IV to 10A.
- 14" rugged clear plastic carrying case with foam inserts. Holds both meter and accessories

True RMS Deluxe DMM with Test Lead Set
Model 2890AKIT

This kit contains the B&K Precision model 2890A Digital Multimeter and a selected assortment of test lead accessories.
Included Test Lead Accessories

- Highly flexible silicone test leads with sheathed (shrouded) 4mm banana plugs; Right-angle for the meter, straight for the accessories, 1.5m long. Rated IEC 61010-031 1000V CAT III / 600V CAT IV to 12A
- Smooth 2mm tip probe bodies, ideal for everyday testing. Ruggedly constructed, they are rated to IEC 61010-031 1000V CAT III / 600V CAT IV to 36A.
- Flexible pincer clips for long reaches. Pincer tips can grip contact points ¬up to 0.16" diameter in either electronic or electrical applications. Rated IEC 61010-031 1000V CAT III / 600V CAT IV to 6A
- General purpose probe leads with flexible PVC jacketed wire, 2mm smooth probe tips and right angle sheathed banana plugs. Rated to IEC 61010-031 1000V CAT III / 600V CAT IV to 10A.
- Spring-loaded tip miniature probe bodies. Small in size for compact probing, they are ideal for miniature probing of electronic circuits. Rated IEC 61010-031 600V CAT III to 1A.
- K-Type thermocouple with banana plug adapter. Utilize the temperature measuring capability of the 2890A DMM with this thermocouple and adapter combination. The bead-tip thermocouple measures between –50° to +392° F and is 1m long.
- 14" rugged clear plastic carrying case with foam inserts. Holds both meter and accessories.

388B DMM with Test Lead set
Model 388BKIT

This kit is ideal for general purpose electronic and electrical trouble shooting or repair. Kit contains flexible pincer and alligator clips for larger components and miniature hook clips for smaller ones.

Included Test Lead Accessories:

- **1.5 Meter Long Silicone 4mm Sheathed Straight to Right-Angle Plug Lead Set**
- **Flexible Pincer Set – Red & Black**
- **Alligator Clip Set – Red & Black**
- **Probe Body Set With 2mm (.080") Diameter Tips**
- **Hook Test Clip to 4mm Banana Jack**
- **Tri-Fold Nylon Pouch**

391A True RMS DMM with Test Lead set
Model 391AKIT

The 391AKIT is the perfect kit for anyone testing or measuring electronic circuits. Kit includes spring-load tip miniature probes for testing those micro-sized circuits.

Included Test Lead Accessories

- **1.5m Long Silicone 4mm Sheathed Straight to Right-Angle Plug Lead Set**
- **Flexible Pincer Set – Red & Black**
- **Probe Body Set With 2mm (.080") Diameter Tips.**
- **Miniature Spring-Tip Probe – Red & Black**
- **Tri-Fold Nylon Pouch**

2704B DMM with Test Lead set
Model 2704BKIT

This kit includes a perfect introduction meter and accessories. Basic starter leads for everyday use.

Included Test Lead Accessories

- **1.5m Long Silicone 4mm Sheathed Straight to Right-Angle Plug Lead Set**
- **Alligator Clip Set – Red Black**

Multimeter Accessories

Model TL 130A

General Purpose DMM Kit

If you need only one basic accessory kit for your meter, this is the one. Attach probes or clips to the sheath plug to complete your test. Soft, flexible silicone leads make movement easy. Kit is voltage and current rated for either electronic or electrical applications.

- **All components compliant to IEC61010-2-031**
- **Silicone Lead Wire length 60" (1.5m)**
- **Tri-fold Velcro Pouch**

Features	model TL 130A		
4mm Straight to Right-Angle Silicone Leads, 1.5m	1000V	CATIII	12A
Probe Bodies w/Ø2mm Tip	1000V	CATIII	36A
Alligator Style Clips	1000V	CATIII	20A
Alligator Clips	300V	CATI	3A

Model PR 28A

40kV High Voltage DMM Probe

If the voltages you need to measure are above the specifications of general purpose probes, B+K Precision has a higher voltage probe for you.

Features	model PR 28A		
Attenuation	x1000	Impedance	1000MΩ
Voltage (AC)	20kV	Accuracy (AC & DC)	±3%
Voltage (DC)	40kV	Cable Length	48" (1.2m)
Bandwidth	60Hz		

Model TL-50

Maxi-Pro DMM Kit

Complete accessory kit for all your testing needs. Includes soft, flexible silicone lead wire easy movement and Tri-Fold Velcro Pouch for convenient storage.

- **All components compliant to IEC61010-2-031**
- **Silicone Lead Wire length 60" (1.5m)**
- **Tri-fold Velcro Pouch**

Features	model TL-50		
4mm Straight to Right-Angle Silicone Leads, 1.5m	1000V	CATIII	12A
Probe Bodies w/Ø2mm Tip	1000V	CATIII	36A
Pincer Style Clips	1000V	CATIII	6A
Alligator Clips	300V	CATI	3A
Spade Lug Adapters	42V (1000V)		36A
Banana Plug Adapters	42V (1000V)		36A
Fully Insulated Alligator Clips	1000V	CATIII	20A

Model CP 3

DC/AC Current Clamp

- **Converts any DMM to a current clamp**
- **Measures current without disconnecting circuit under test**
- **Measures to 400A DC or AC**
- **Outputs 1 mV per Amp, operates on 2V range of any DMM**

Specifications	model CP 3
(Accuracy specified at 18° to 28°C)	
Current Range	2A to 400A, DC or AC
Frequency Response (AC)	50 Hz - 400 Hz
Accuracy	±(2% reading + 2A)
Input Resistance	10kΩ min.
Maximum Conductor Size	1.1"(30mm)
Power Requirement	9V battery, NEDA 1604
Battery Life	100 hr typical
Operating Temperature	0° to 40°C, <70% RH
Storage Temperature	-20° to + 70°C, <80% RH

Replacement Test Leads

Model TL 2A

Deluxe Test Lead Sets

- **IEC61010 1000V CATIII Rating**
- **Silicone Lead Wire length 60" (1.5m)**
- **Black Alligator Clip included**
- **Threaded tips fits TL-3 Accessory kit items**

Model TL 3

Probe Accessory Kit

- **Threaded accessories to fit TL-2A probes – Black and Red pairs (except for alligator clip)**
- **Alligator clip, Red only**
- **Spring hook clips**
- **4" Sharp extension tips to reach tight test points**
- **No. 10 Spade lugs**

Model TL 1
Model TL 4

Economical replacement test leads. TL-1 has safety shrouded banana plugs.
TL-4 has un-shrouded banana plugs.

TL-1

TL-4

- **1500V 3A ratings**
- **PVC lead wire, 40" (1.0m)**
- **Black and Red Alligator clips**

TL 8

Surface Mount Tweezers

- **Two conductor leads**
- **400V rms, 1A**

Oscilloscopes

WHAT DO OSCILLOSCOPES DO?

B+K Precision® offers a broadest line of oscilloscopes including digital and analog/digital oscilloscopes ranging from a 30 MHz analog dual-trace unit to 100MHz lab scope. No matter what your application design, service, production or home use, B+K Precision® has an oscilloscope that meets your requirements.

An oscilloscope is a test instrument that visually displays an electronic signal on a display screen. The display shows voltage (vertical) and time (horizontal). You can view the screen and through interpretation of the settings on the oscilloscope determine the instrument's voltage, and the general characteristics of the signal.

WHERE ARE OSCILLOSCOPES USED?

An oscilloscope is a test instrument that can be used in a wide variety of applications:

EDUCATION - used in technical schools to demonstrate electrical theory

DESIGN - used in circuit design to verify design parameters

SERVICE - used for the repair of electronic equipment

MAINTENANCE - used to verify operation for set-up or repair equipment

FIELD SERVICE - used for in-the-field repair of equipment

MANUFACTURING - used as part of the manufacturing process to verify performance parameters of UUTs (Units Under Test)

QUALITY CONTROL - used for final testing of equipment.

WHAT IS BANDWIDTH?

Bandwidth is the frequency range of signals that can be viewed on the oscilloscope. When selecting an oscilloscope, consider present and future bandwidth requirements of the instrument.

ANALOG VS. DIGITAL STORAGE

B+K Precision® provides analog, digital, and mixed analog/digital oscilloscopes. Analog oscilloscopes range from 30 MHz to 100 MHz in bandwidth. The digital and analog/digital model provides a bandwidth of 20 & 25MHz. The main benefits of digital storage oscilloscopes are:

- **capability to store waveforms for analysis**
- **ability to view / store pre-trigger information**
- **ability to detect / display / capture glitches**
- **ability to get a hard copy printout of the captured signal**
- **ability to view slow events**
- **ability to view one time events**

ARE OSCILLOSCOPES HARD TO USE?

B+K Precision analog and digital oscilloscopes have a number of features that provide ease of use. These features include:

AUTOSET - provides automatic setup of time base, vertical axis and trigger parameters of the signal being viewed. This allows most signals to be displayed. You can then readjust the timebase and vertical axis as you require.

Automatic Measurements - Depending on the model, up to 17 automatic measurements are displayed by readouts on the screen.

Analog or Digital Operation - B+K Precision® analog / digital oscilloscope provides the benefits of both analog and digital operation in one unit. A single button is used to go from analog to digital storage operation.

OSCILLOSCOPE SELECTION

Refer to the following page for definitions of common digital terminology. When selecting an oscilloscope, answer these questions: Considering present and future needs, what maximum bandwidth will be required? Will you need to store the signals you are viewing? Review the selection chart on page 76 to prescreen all models. Then turn to the specific model number page for complete specifications.

OSCILLOSCOPE TERMS

ACCELERATING VOLTAGE—The internal voltage that causes trace illumination on the oscilloscope display. A higher voltage is needed at fast sweep speeds.
BANDWIDTH—The frequency range of signals that can be observed on the oscilloscope with minimal degradation. Typically, bandwidth is specified in megahertz (MHz) and is the maximum frequency at which signals are within -3dB in amplitude.
DELAYED TIME BASE—Allows a single signal to be viewed at two different sweep speeds, by expanding a portion of the waveform and starting at some point after the main time base begins. This is more useful than merely magnifying the display because it allows all parts of the main sweep signal to be observed with any desired amount of expansion or horizontal magnification.
DUAL TIME BASE—A dual time oscilloscope allows you to view one signal at two different sweep speeds simultaneously, with delayed trigger. One sweep can be used to observe a complete waveform (such as a full frame of a video signal) while the second sweep is used to expand the signal and view only a portion of it (such as a single line of the same video signal).
EXTERNAL TRIGGER—Externally supplied signal that starts the sweep.
INPUT IMPEDANCE—The AC and DC resistance that a signal "sees" at the oscilloscope input.
RISE TIME—The minimum time that it takes the CRT beam to rise from the 10% mark on the CRT graticule to the 90% mark on the graticule. Oscilloscope rise time specifications are directly related to bandwidth.
SWEEP—The motion of the CRT beam from left to right that causes the trace to appear. A sweep time of 0.1 ms/div means that the beam moves across one division of the CRT in 0.1 ms. Faster sweep speeds are required to view higher frequency signals.
SWEEP MAGNIFIER—Allows a portion of a displayed waveform to be magnified (typically X10) without actually shortening the sweep time setting. This is an advantage over simply increasing the sweep speed because increasing the sweep speed can result in the desired portion of the waveform disappearing off the screen. Additionally, this feature increases the maximum sweep speed by the magnification factor.
TRIGGER—Signal that starts the sweep of the oscilloscope CRT beam across the display. The trigger level controls the amplitude at which the sweep will begin.
VERTICAL SENSITIVITY—The signal level required to cause a single division of vertical deflection. For example, for a vertical attenuator setting of 5 mV/div, a 5 mV peak signal will produce one division of vertical deflection.
V MODE TRIGGERING—V mode triggering permits each waveform viewed to become its own trigger signal. In dual trace operation, the trigger source alternates between channels. Sometimes referred to as alternate triggering.
VERTICAL ATTENUATOR—The precision input circuit controls the level of the input signal. Usually this circuit consists of calibrated steps in a 1-2-5 sequence (i.e., 10 mV/div, 20 mV/div, 50 mV/div. etc) which allow the oscilloscope to display signals with levels from many volts to only a few millivolts.
VIDEO SYNC—Allows vertical (TV V) or horizontal (TV H) video sync pulses to be selected for triggering. Vertical sync pulses are selected to view vertical fields or frames of video and horizontal sync pulses are selected for viewing horizontal lines of video. Sometimes referred to as TV sync.
X-Y DISPLAY—Mode of operation which displays a graph of two voltages. The Y axis is the vertical axis (usually channel 1) and the X axis is the horizontal axis (usually Channel 2).
Z-AXIS—Allows an external signal to control the intensity of the CRT beam. Also referred to as intensity modulation.

DIGITAL OSCILLOSCOPE TERMS

BYTE—Usually contains eight bits of digital information (sometimes contains 10 to 12 bits). Also referred to as a word.
EQUIVALENT TIME SAMPLING—A method of sampling used by some Digital Storage Oscilloscopes to allow them to capture repetitive waveforms with frequencies that are higher than the sampling rate.
HARD COPY—A paper copy of the displayed waveform made by an external plotter.
HORIZONTAL RESOLUTION—The number of points possible across the oscilloscope display. Usually, if the horizontal resolution is 1 K (1024), there will be 1000 points (samples) plotted across the display from the far left vertical graduation to the far right graduation. (100 points or samples per division).
INTERFACE—Ability to talk to and/or receive commands from an external computer or other electronic device.
MEMORY—The electronic circuitry that stores the digitized signal. For DSO's, memory is usually specified in kilobytes. One kilobyte contains 1024 bytes of information.
PRE-TRIGGER—The ability of a DSO to view signals before the trigger. This allows the user to determine the cause of many undesired effects in electrical and electronic equipment.
REFRESH MODE—The trace moves across the CRT from left to right (just like a conventional oscilloscope) and the display is refreshed (updated) each time a trigger occurs.
ROLL MODE—The trace moves across the CRT from right to left (like a chart recorder) and is continually updated.
SAMPLE—The digital representative of an instantaneous value of the digital storage oscilloscope's input signal. The DSO works by taking sample of the waveform at various points.
SAMPLING RATE—The rate at which the input signal is converted to a digital signal. Maximum sampling rate is usually expressed in MS/s (megasamples per second).
SINGLE SHOT MODE—Used for capturing one-time events or pre-trigger information.
VERTICAL RESOLUTION—The number of vertical points that are possible on the oscilloscope display. An eight bit DSO allows a vertical resolution of 256, a ten bit DSO allows 1024 points, and a twelve bit DSO allows 4096 points.

Oscilloscopes

Selection Guide

Digital Storage

Analog Bandwidth (MHz)	Sample Rate	Memory per Channel	Cursors & Readout	Data Output	Model	Page
25	250MS/s	2 x 1K	YES	USB	**2530**	**77-79**
20	10MS/s	2 x 2K	NO	Analog	**2522B**	**80**

All B+K Precision digital storage oscilloscopes are dual channel and have Equivalent Time Sampling.

Analog

Band-width (MHz)	Vertical Sensitivity	Max Sweep Rate	Delayed Dual/Sweep TimeBase	Single Delay Line	Y-Mode Alternate Trigger	External Trigger	Model	Page
100	5mV/div to 100MHz	20ns/div	YES	YES	NO	YES	**2190B**	**81**
60	5mV/div to 60MHz	0.1μs/div	YES	YES	YES	YES	**2160A**	**82**
40	5mV/div to 40MHz	10ns/div	YES	NO	NO	YES	**1541D**	**83**
30	5mV/div to 30MHz	0.1μs/div	YES	NO	YES	YES	**2125A**	**84**
30	5mV/div to 30MHz	0.1μs/div	NO	NO	YES	NO	**2120B**	**85**
30	5mV/div to 30MHz	0.1μs/div	NO	NO	YES	NO	**2121***	**86**

All B+K Precision analog oscilloscopes are dual channel and have Video Sync (TV-V and TV-H).
* Built-in 50 MHz frequency counter

Probes

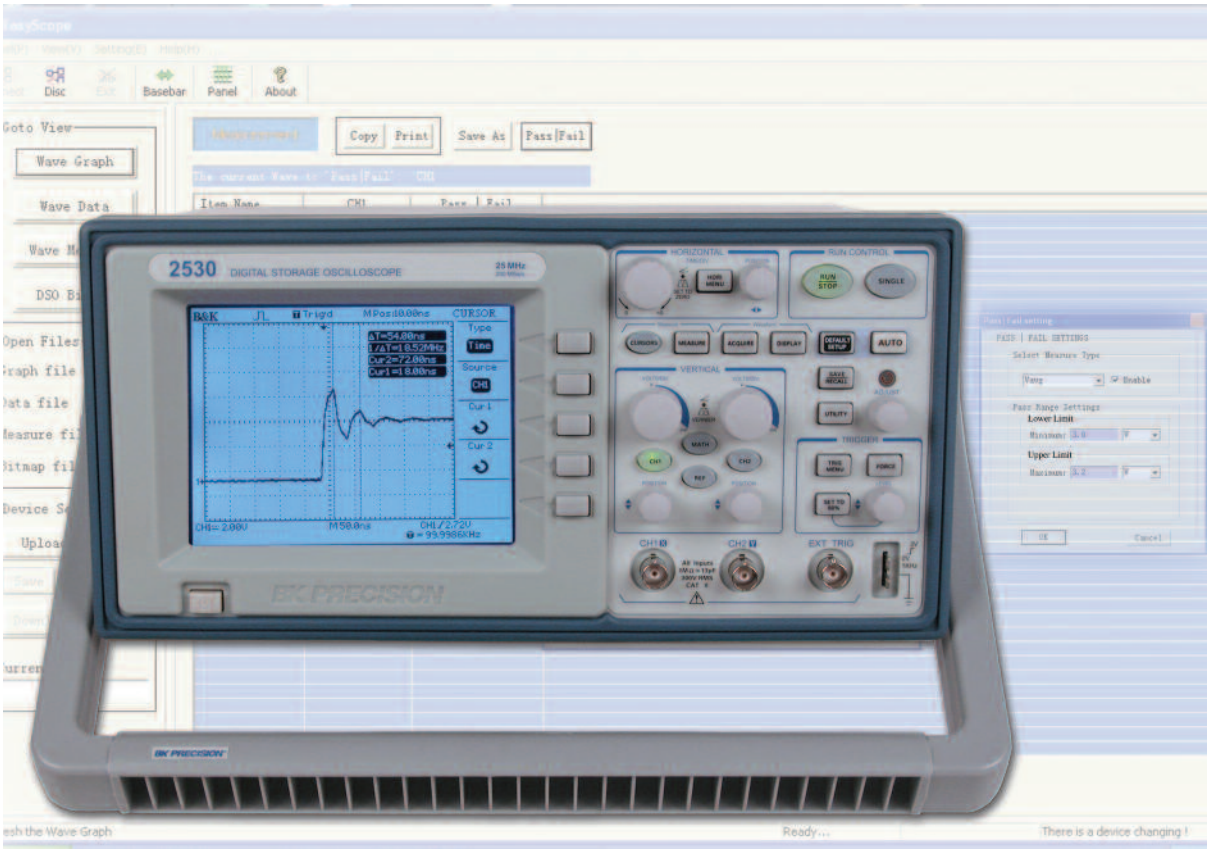
Bandwidth (MHz)	Max. Voltage	Description	Model	Page
90 MHz	600 V	X1, X10 selectable, for scopes to 60 MHz	**PR-33A**	**88**
150 MHz	600 V	X1/X10/REF selectable, for scopes to 100 MHz	**PR-37AG**	**88**
150 MHz	600 V	X1/x10 selectable Low Capacitance	**PR-150**	**88**
250 MHz	1200V	X100, fixed, high voltage probe, for scopes to 250 MHz	**PR-100A**	**88**
100kHz - 650 MHz	200V	Demodulator Probe, for all scopes	**PR-32A**	**87**

Carrying Case

Dimensions	Weight	Material	Model	Page
15 x 7.5 x 17.5" (381 x 191 x 445mm)	2.36 lbs. (1070g)	1000D Navy Cordura 400D nylon pack cloth	**LC-210A**	**153**

Digital Storage Oscilloscope 25MHz, 250MSa/s

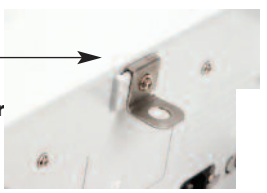
Model 2530



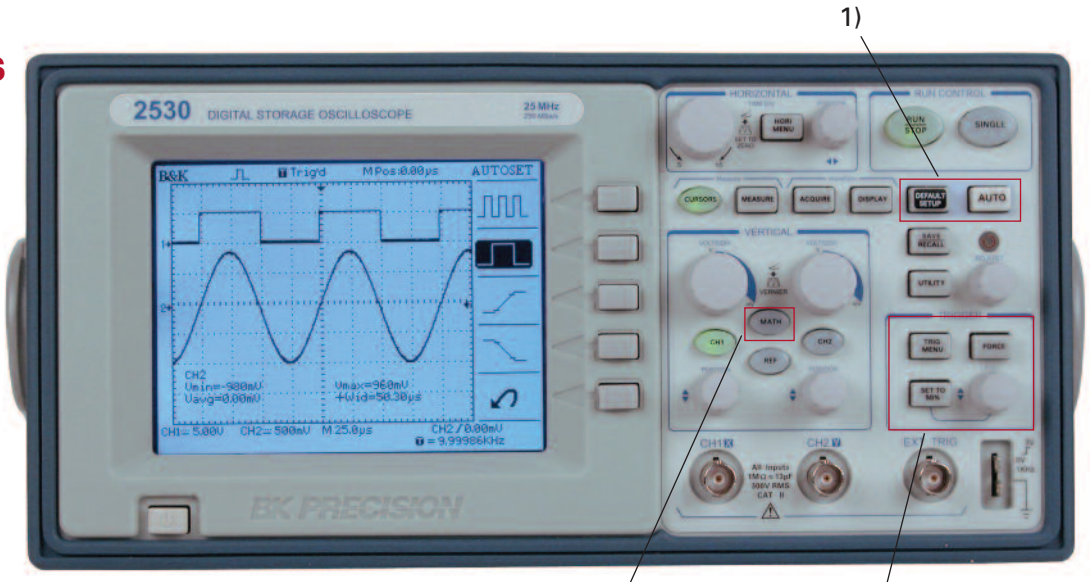
ESSENTIAL FEATURES FOR THE COST CONSCIOUS USER

The 2530 Digital Storage Oscilloscope delivers essential features and reliable performance at a price you can afford. Analog style knobs and controls combined with Autoset functions make this oscilloscope easy to use. Advanced triggering, automatic measurements and FFT functions provide you with many options to debug your circuits. Additionally, the instrument comes with PC Software that lets you easily capture, save and analyze waveforms and measurement results. The 2530 is an ideal education and training tool and also well suited for applications in service and repair.

- **One touch automatic setup for ease of use (Auto)**
- **25 MHz bandwidth, 250MSa/s sample rate**
- **4000 point record length for each channel**
- **Capture, save and analyze waveform data with the included EasyScope Application Software**
- **Cursors with readouts**
- **Eleven automatic measurements**
- **FFT standard plus 4 additional math functions**
- **Extensive Trigger capabilities including Pulse Width and line-selectable Video trigger**
- **Save/Recall setup and waveform data**
- **Security loop**
  Use the built-in cable channel to secure your oscilloscope to your location



Oscilloscopes



Front Panel Features

1) Easy setup and use
The AUTO button identifies the input signal and automatically sets up the vertical, horizontal and trigger controls to produce a useable display. You can customize the display by selecting option single cycle, multiple cycle, rising or falling edge. Press the DEFAULT button to instantly restore the default setting. Users familiar with analog oscilloscopes will appreciate the analog style controls and features.

2) Waveform analysis with math and FFT
Analyze your signal with add, subtract multiply and divide functions. View the signal's frequency domain spectrum and perform harmonic distortion analysis.

3) Advanced triggering
Isolate the signal with advanced triggering including pulse width and selectable video trigger.

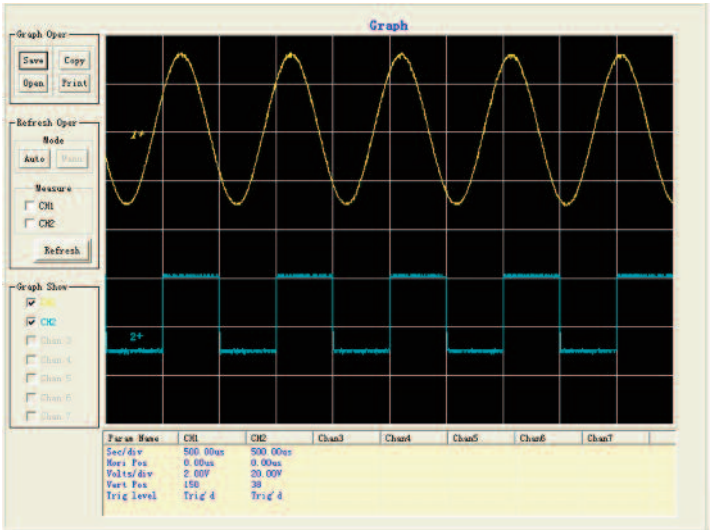
Auto calibration
Automatically calibrate the instrument's vertical and horizontal system.

Stored setups and waveforms
Store up to 10 waveforms and 2 setups for future reference and use.

11 automatic measurements
Increase your efficiency. Execute and display 11 measurements simultaneously.

XY Mode
Unlike comparable models in the market, the 2530 supports settable sample rates of 5kSa/s – 200kSa/s when operating in XY mode.

Simple Documentation and Analysis



The included Easyscope software provides seamless integration between oscilloscope and PC. Capture and transfer waveforms, screen images, setups and measurement results to a Windows PC via the USB device port on the back of the instrument.

- **Save waveform data in csv (Microsoft Excel) format for post acquisition analysis**
- **Document your results: Print, save or copy/paste wave form data and measurement results. Save and print bitmap images and setups**
- **Capture waveforms and measurement results manually or automatically at user defined intervals. In automatic mode, the smallest refresh rate is 0.5 seconds, allowing for virtually real time waveform capture**
- **Generate real-time Pass/Fail verdicts for captured measurement results**

TEL. (714) 921-9095, FAX (714) 921-6422

Specifications

model	2530
Performance Characteristics	
Bandwidth	25 MHz
Real time sample rate on each channel	250 MSa/s
Channels	2
Display	1/4 VGA Monochrome LCD
Rise Time	<14ns
Record Length*	4000 points
Vertical Resolution	8 bits
Vertical Sensitivity	2mV - 5V/div
DC gain accuracy	±3.0%
Maximum Input Voltage	300 Vrms, CAT II (between signal and reference BNC connector)
Position Range	2mV – 100mV range ±2V 200mV - 5V range: ±40V
Time Base range	2.5 ns/div – 50 s/div
Timebase accuracy	100 ppm
Input Coupling	AC, DC,GND
Input Impedance	1MΩ in parallel with13pf
Vertical and Horizontal Zoom	Vertically or horizontally expand or compress a live or stopped waveform
I/O interface	USB device port for connection to PC. (Requires included EasyScope Software for use)

* The instrument displays 2500 points. 4000 points can be retrieved from internal memory with the included EasyScope application. This feature is supported for a time base settings range of 2.5µs/Div-50ms/Div (scan mode is not active)

Acquisition Modes	
Sample	Display sample data only
Peak Detect	
Average	Waveform averaged, selectable from 4,16,32,64,128,256
Scan Mode	For time base settings 0.1s/div-50s/div

Trigger System	
Trigger Types	Edge, Pulse Width, Video*
Trigger Modes	Auto, Normal, Single
Trigger Coupling	AC, DC, LF reject, HF reject
Trigger Source	CH1, CH2, AC line, Ext, Ext/5

*Support formats PAL/SECAM, NTSC. Triggers on odd or even field, all lines or line number

Cursors	
Types	Amplitude, Time
Measurements	∅V, ∅T, 1/∅T

Specifications (Continued)

Automatic Waveform Measurement	
Time	Rise time, Fall Time, Cycle Frequency, Period, Positive Pulse Width, Negative Pulse width
Voltage	MAX, MIN, Peak-Peak, Average, Vrms
Frequency	Hardware counter provides frequency readout of trigger source with 6 digit resolution

Waveform Math	
Math function	FFT, add, subtract, multiply, divide
FFT	Windows: Hanning, Hamming, Blackman, Rectangular 1024 sample points

Autoset	Single button automatic setup of both channels for vertical, horizontal and trigger systems

Display	
Display Mode	1/4 VGA (5.7") monochrome LCD (320x240) with adjustable contrast and inverse video
Display Types	Point, Vector
Persistence	Off, 1s, 2s, 5s, infinite
Waveform Interpolation	Sin(x)/x, Linear
Format	YT and XY

Power Requirements	100-240 VAC, 50VAmax, 45Hz to 440Hz

Environmental	
Temperature	Operating: 0°C to +55°C Nonoperating: -40°C to +70°C
Humidity	Operating: 95%RH, 40°C Nonoperating: 90%RH, 65°C
Altitude	Operating to 4000m
Pollution Degree	Pollution degree 2 for indoor use only.

Electromagnetic compatibility and Safety	
EMC	This oscilloscope is in compliance with council EMC directive 2004/108/EC
Safety	EN61010-1:2001

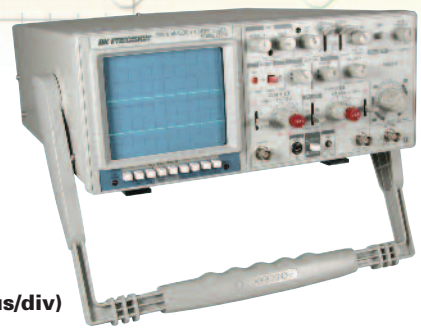
General	
Dimensions	11.4in x 5.9in x 5.9in 290mm (Width) x 150mm (Height) x 300mm
Weight	10 lbs (4.6 kg)

Accessories

One Year Warranty

SUPPLIED: User Manual, 10:1 Probe set (2 pieces), Power cord , USB interface cable, EasyScope Software Installation disk
OPTIONAL: PR 37A 10:1 Probe, PR 32A Demodulator Probe, PR-55 High Voltage Probe

20MHz Analog / Digital Storage Oscilloscope



Model 2522B

- **20MHz analog bandwidth**
- **10MS/s sampling rate each channel**
- **2k memory per channel**
- **1GHz equivalent time sampling (at 0.1 µs/div)**
- **Pre-trigger capture**

Digital Mode Specifications

	model 2522B
Storage Word Size	2048 x 8 bits/channel; (2 k/channel with direct sampling, 1 k/channel with equivalent time sampling).
Vertical Resolution	1 in 256, approximately 25 steps/div.
Horizontal Resolution	1 in 2048, approximately 200 samples/div.
Sampling Rate	10 M samples/sec to 4 samples/sec, reduced in proportion to time base. Direct sampling at time base settings of 20 µs/div and slower, equivalent time sampling at time base settings of 10 µs/div and faster.
Time Base Expander	For storage of slow time events, time base steps 10 ms/div and slower have selectable 1/1 or 1/100 rate. 1/100 rate expands time base from 1 sec/div to 50 sec/div in 1-2-5 sequence.
Equivalent time Sampling Bandwidth	20MHz for repetitive waveforms.
Dot Joining	Linear interpolation between samples.

DIGITAL DISPLAY MODES

Roll	Stored data and display updated continually.
Refresh	Stored data and display updated by triggered sweep.
Hold	Freezes channel 1 and channel 2 data immediately.
Save CH 2	Freezes channel 2 data immediately.
Pretrigger Storage	Available in single shot mode, switchable to 0% or 50%.
LED Indicators	Trigger (green), Arm (red), Pen Down (red).

PLOT OUTPUT

CH1 and CH 2 Outputs OUTPUT and CH 2 OUTPUT	Selected by PLOT switch on rear panel. Output via CH 1 jacks on rear panel. Amplitude 0.1 V/div (1 V maximum).
Output Sweep Rate	Output sweep rate is 1/10 of TIME/DIV setting (and 1/100 switch when applicable).
Pen Lift Output	Available at Pen Down jack on rear panel. TTL high, Pen Up. TTL low, Pen Down.

Analog Mode Specifications

VERTICAL AMPLIFIERS (CH 1 and CH 2)

Sensitivity	5 mV/div to 5 V/div in 1-2-5 sequence, 10 steps. Vernier control provides fully adjustable gain between steps. Pull x5 increases maximum sensitivity to 1 mV/div (at reduced bandwidth).
Accuracy	±3%, ±5% at x5 MAG
Input Resistance	1MΩ ±2%
Input Capacitance	25pF ±10pF
Frequency Response	5 mV to 5 V/div: DC to 20 MHz (-3 db). x5:DC to 10MHz (-3dB)
Rise Time	Approximately 17.5 ns (overshoot ≤3%)
Polarity Reversal	CH 2 only
Maximum Input Voltage	400 V (DC + AC peak)

MAXIMUM UNDISTORTED AMPLITUDE

DC-to-20 MHz	4 divisions
DC-to-10 MHz	8 divisions

OPERATING MODES

CH 1: CH 1, single trace	CH 2: CH 2, single trace
ALT	Dual trace, alternating
CHOP	Dual trace, chopped
ADD	Algebraic sum of CH 1 + CH 2

SWEEP SYSTEM

Sweep Speed	0.1 µs/div to 2 s/div in 1-2-5 sequence, 23 steps. Vernier control provides fully adjustable sweep time between steps.
Accuracy: +3%	Sweep Magnification: 10X, +6%
Hold off	variable.

TRIGGERING

Modes: AUTO (free run) or NORM. Source: CH1, CH2, ALT, EXT, LINE.	
Maximum External Trigger Voltage: 200V (DC + AC peak).	
Sensitivity	Internal - 0.5 division, External - 500 mV.

TRIGGER COUPLING

AC	30 Hz to 30 MHz.
TV H/HF:	Used for triggering from horizontal sync pulses. Low frequencies are attenuated.
TV V DC/LF:	Used for triggering from vertical sync pulses. High frequencies are attenuated. Direct coupled.

HORIZONTAL AMPLIFIER (Input thru CH 1 Input)

X-Y Mode	Switch selectable using X-Y switch
	CH 1: X axis CH 2: Y axis
Sensitivity	Same as vertical channel 1
Accuracy	Y-Axis: ±3%. X-Axis: ±6%
Input Impedance	Same as vertical channel 1
Frequency Response	DC to 2 MHz typical (-3 dB) (to 6 divisions horizontal deflection)
X-Y Phase Difference	Approximately 3° at 50 kHz
Maximum Input Voltage	Same as vertical channel 1

Other Specifications

CRT

Type	Rectangular with internal graticule
Display Area	8 x 10 div (1 div = 1 cm).
Accelerating Voltage	2 kV
Phosphor	P31
Trace Rotation	Electrical, front panel adjustable

ENVIRONMENT

Within Specified Accuracy	50° to 95°F(10° to + 35°C), 85% maximum RH
Full Operation	32° to 104°F (0° to + 40°C), 85% maximum RH
Storage	-4° to 158°F (-20° to + 70°C)

OTHER

CH 1 Output	(on rear panel)
Output Voltage	25mV/div (nominal into 50 Ω load)
Output Impedance	Approximately 50 Ω
Frequency Response	20 Hz to 10MHz, -3 dB into 50 Ω
Cal/Probe Compensation Voltage	0.5 Vp-p +3% square wave, 1kHz nominal
Power Requirements	110 V/125/220/240 VAC, 50/60 Hz, approximately 60 W
Dimensions (HxWxD)	5.2 x 12.8 x 15.6" (132 x 324 x 397 mm)
Weight	19 lb (8.6 kg.)

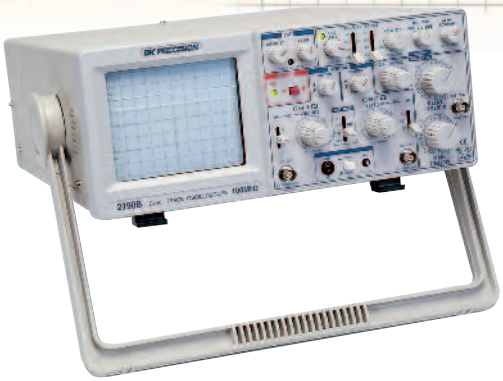
Accessories

Three Year Warranty

SUPPLIED: Instruction Manual, Two PR 33A x1/x10 Probes or equivalent, AC Power Cord, Spare Fuse

OPTIONAL: PR 32A Demodulator Probe, PR 37AG x1/x10/REF. Probe, PR 100A x100 Probe, PR-55 High Voltage x1000 Probe, LC 210A Carrying Case

TEL. (714) 921-9095, FAX (714) 921-6422



100MHz Analog Oscilloscope

Model 2190B

- **Dual time base oscilloscope (2 channel)**
- **5mV/division sensitivity**
- **Sweeps to 5ns/division**
- **23 calibrated ranges, main time base**
- **Signal delay line**
- **15 kV accelerating voltage**
- **Channel 2 output**

Specifications

	model 2190B
VERTICAL AMPLIFIERS (CH 1 and CH 2)	
Sensitivity	5mV/div to 5 V/div. 1 mV/div to 1V/div (at X5 MAG)
Attenuator	10 calibrated steps in 1-2-5 sequence. Vernier control provides fully adjustable sensitivity between steps, adjustment range 1/1 to 1/2.5
Accuracy	±3% (±5% at X5 MAG)
Input Impedance	1MΩ ±3%
Input Capacitance	25 pF ±10pF
Frequency Response	DC: DC to 100 MHz (-3 dB)
X5 MAG	DC to 20 MHz (-3 dB)
AC	10Hz to 100 MHz (-3 dB)
Rise Time	3.5 ns (Overshoot ≤5%)
Signal Delay Time	Variable
Square Wave Characteristics	Overshoot less than 5%, 10 mV/div range
	Other ranges within 5% additional
Maximum Input Voltage	400V (DC + AC peak)
VERTICAL AMPLIFIERS	
Operating Modes	CH 1, CH 2, Dual, Add
Delay Time Between Channels	Within 1 ns between CH 1 and CH 2
Crosstalk	30:1 at 100 kHz
SWEEP SYSTEM	
Operating Modes	
A	A sweep
B	Delayed B sweep
B TRIGGERED	B sweep triggered after delay
A Time Base	
Sweep Mode	Auto, normal
Sweep Time:	5s to 20ns/div., 23 steps in 1-2-5 sequence with variable control
Accuracy	± 3%
Hold Off Time	Continuously variable. Adjustment range from normal to 1.5 times the sweep time
B Time Base	
Delay Method	Continuous delay. Triggered delay
Sweep Time	20ns. to 0.5s/div., 23 steps in 1-2-5 sequence
Accuracy	± 3%
Delay Time	Start point: 0.5 div to + 0.3 div. End point: 10 div + 1 div
Delay Jitter	Within 1/10,000 of full scale sweep time
TRIGGERING	
A Trigger	
Source	CH 1, CH 2, LINE, EXT
Sensitivity	30Hz to 110MHz
TV-V	20Hz - 30kHz
TV-H	3kHz - 100kHz
Slope	+ or -
B Trigger	The A trigger is also the B trigger
EXTERNAL TRIGGER	
Input Impedance	1mΩ, 30pF
Maximum Input Voltage	300V (DC + AC peak)
HORIZONTAL AMPLIFIER	
X-Y Mode	X Axis = CH 1. Y Axis = CH 2
Sensitivity	5 mV/div to 5 V/div, CH 1 and CH 2
Accuracy	±3% calibrated position, ±6% using x10 MAG
Frequency Response	DC to 2 MHz (-3dB)
CH2 (Y) OUTPUT	
Output Voltage	Approx. 100mV/div open circuit Approx. 50 mV/div into 50Ω
Freq. Response	50 Hz to 30 MHz.
Output Impedance	approx. 50Ω
CRT	
Type	Rectangular with integral graticule
Display Area	8 x 10 div (1 div = 1 cm)
Accelerating Voltage	15kV
Phosphor	P31
Scale Illumination	None
Trace Rotation	Electrical, front panel adjustable

Other Specifications

Z Axis (Intensity Modulation)	Sensitivity: 3 V or greater, TTL level. Negative polarity increases brightness
Input Impedance	15 kΩ
Usable Freq. Range	DC to 3.5 MHz
Maximum Input Voltage	20 V (DC + AC peak)
CAL/Probe Compensation	
Waveform	Positive going squareware
Output Voltage	0.5 V p-p ±3%
Frequency	Approx. 1kHz
Duty Cycle	50 ± 5%
Power Requirements	100/120/220/240/ VAC ±10%, 50/60 Hz, approximately 55 W
Dimensions (HxWxD)	12.76 x 15.68 x 5.2" (324 x 398 x 132 mm)
Weight	18.7 lbs (8.5 kg)
ENVIRONMENT	
Within Specified Accuracy	50° to 95°F (10° to 35°C), 85% maximum RH
Full Operation	32° to 104°F (0° to +40°C), 85% maximum RH
Storage	-4° to 158°F (-20°to +70°C)

Accessories

Three Year

SUPPLIED: Instruction Manual, Two PR 37A x1/x10/Ref. Probes or equivalent,
AC Power Cord, Spare Fuse

OPTIONAL: PR 32A Demodulator Probe, PR 37AG x1/x10/REF Probe, PR 100A x100 Probe, PR-55 High Voltage x1000 Probe,

60 MHz Analog Oscilloscope

Model 2160A

- **5mV/div sensitivity**
- **23 calibrated ranges-main time base**
- **23 calibrated ranges-delayed time base**
- **Signal delay time**
- **Component tester**
- **Z axis input**
- **Single sweep**

Specifications

model **2160A**

VERTICAL AMPLIFIERS (CH 1 and 2)

Sensitivity	5mV/div to 1V/div x 5mag
Attenuator	1-2-5 sequence, plus x 5 gain step, Vernier control provide fully adjustable sensitivity between steps range 1/1 to at least 1/2.5
Accuracy	±3%, 5mV to 5V/div; ±5%, 1mV, 2mV/div
Input impedance	1MΩ ±2%
Input Capacitance	25pF±10%
Frequency Response	DC to 60 MHz
Rise Time	5.8ns (Overshoot ≤5%)
Operating Modes	CH1, CH2, Dual, Alternate Chop
Polarity Reversal	CH 2 invert
Maximum Input Voltage	400V (dc + AC Peak), 800 VAC p-p

SWEEP SYSTEM

Sweep Display Modes	Main, Mix, Delay
Hold Off Time	5:1 continuously variable

Main Sweep

Sweep Speed	0.1μs/div. to 2.0s/div. in 1-2-5 sequence, 23 steps
Accuracy	±3%
Variable Time Control	5:1,uncalibrated, continuously variable between steps
Sweep Magnification	10 x , ±10%, extended sweep speed up to 10ns/div

Delay Sweep

Sweep Speed	0.1 μs/div. to 2.0s/div. in 1-2-5 sequence, 23 steps
Accuracy	±3%
Sweep Magnification	10 x , ±10%, extended sweep speed up to 10ns/div
Delay Time Position	Variable control to locate desirable waveform for extending

Triggering

Trigger Coupling	AUTO, NORM, TV-V, TV-H
Trigger Source	CH1, CH2, ALT, EXT. LINE
Slope	+/-

HORIZONTAL AMPLIFIER

(Input through channel 2 input)	
X-Y Mode	CH 1: Y axis. CH 2: X axis
Sensitivity	Same as vertical channel 2
Accuracy	±3%, Y axis; ±5% X axis
Input Impedance	Same as vertical channel 2
Frequency Response	DC: DC to 1MHz (-3 dB). AC: 5 Hz or 2 MHz (-3 dB)
X-Y Phase Difference	3° at at 50 kHz
Maximum Input Voltage	Same as vertical channel 2

CH 2 Output (on rear panel)	
Output Voltage	50 mV/div (nominal into 50 Ω load)
Output Impedance	Approximately 50 Ω
Frequency Response	20Hz to 60MHz, -3dB into 50V

CRT

Type	6-inch rectangular with internal graticule
Display Area	8 x 10 div (1 div = 1 cm)
Accelerating Voltage	12 k
Phosphor	P31
Scale Illumination	Continuously variable
Trace Rotation	Electrical, front panel adjustable

COMPONENT TESTER

Components Tested	Resistors, capacitors, inductors, and semiconductors
Test Voltage	6V rms maximum (open)
Test Current	11mA maximum (shorted)
Test Frequency	Line frequency (60 Hz in USA)

Other Specifications

Cal/Probe	
Compensation Voltage	2.0 V p-p ±2% square wave, 1 kHz nominal
Sweep Output	TTL level allows synchronization of external equipment with scope sweep

Intensity Modulation

Input Signal	TTL level, intensity increasing with more negative levels
Input Impedance	Approx. 1 kΩ
Usable Freq. Range	DC to 5 MHz
Maximum Input Voltage	5V (DC + AC peak)

Environment

Within Specified Accuracy	50° to 95°F (10° to 35°C), 85% maximum RH
Full Operation	32° to 122°F (0° to +50°C), 10 - 80% RH
Storage	-22° to 158°F (-30° to +70°C), 10 - 90% RH
Power Requirements	110/120/220/240 V ±10%, 50/60 Hz
Dimensions (H x W x D)	12.76 x 15.68 x 5.2" (324 x 398 x 132mm)
Weight	16.75 lbs. (7.6kg)

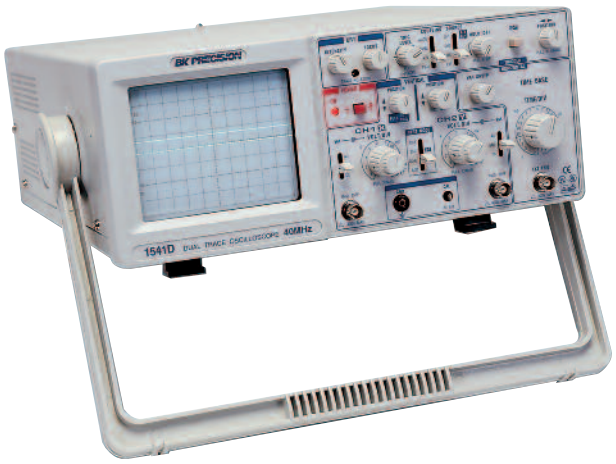
Accessories

Three Year Warranty

SUPPLIED: Instruction Manual, Two PR 33A x1/x10 Probes or equivalent, AC Power Cord, Spare Fuse

OPTIONAL: PR 32A Demodulator Probe, PR 37AG x1/x10/REF Probe, PR 100A x100 Probe, PR-55 High Voltage x1000 Probe, LC 210A Carrying Case

40 MHz Analog Oscilloscope



Model 1541D

- **5mV/div sensitivity**
- **19 calibrated sweeps**
- **Video sync separators**
- **X10 sweep magnification**

Specifications

model 1541D

VERTICAL AMPLIFIERS (CH 1 and CH 2)

Sensitivity	5 mV/div to 5 V/div, 1 mV/div, with X5 gain
Accuracy	5 mV/div to 5 V/div, ±3% (X5 gain), ±5%
Input Impedance	1MΩ±2%, 25pF ±10%
Frequency Response	DC to 40 MHz (-3dB), DC to 7 MHz (-3dB) at X5 gain
Rise Time	8.8 ns (Overshoot ≤5%)
Operating Modes	CH 1; CH 2; DUAL; Alternate/Chop; ADD
Chop Frequency	Approximately 250kHz
Max Input	400 V (DC + AC peak)

SWEEP SYSTEM

Sweep Speed	0.2μs/div to 0.2 s/div in 1-2-5 sequence; 20 steps, vernier control provided
Accuracy	±3%
Sweep Magnification	10x
Hold Off Time	5:1 Continuously variable

TRIGGERING

Trigger Modes	Auto, Norm
Trigger Source	Ch 1, CH 2, LINE, EXT, ALT
Trigger Coupling	AC, TV-V, TV-H, NORM

HORIZONTAL AMPLIFIER (Input through EXT TRIG)

X-Y Mode	CH1: Y axis, CH2: X axis
Sensitivity	Same as vertical CH1
Accuracy	Y axis ±3%, X axis ±6%
Input Impedance	same as vertical CH1
Frequency Response	DC to 1MHz (-3dB)

CRT

Display Area	6 inches diagonal, rectangular screen with internal graticule 8 x 10 div (1 div = 1 cm)
Accelerating Voltage	12 kV
Trace Rotation	Front panel adjustable
Phosphor	B31

Other Specifications

Calibrating Voltage	1kHz positive square wave. 2Vp-p, ±3%

ENVIRONMENT

Within Specified Accuracy	50° to 95°F (10° to 35°C), ≤ 85% RH
Full Operation	32° to 104°F (0° to 40°C), ≤ <85% RH
Storage	-4° to 158°F (-20° to +70°C)
Power Requirements	100/120/220/240 V ±10%, 50/60 Hz, approximately 38W
Dimensions (HxWxD)	12.8 x 15.7 x 5.2 " (324 x 398 x 132 mm)
Weight	16.8 lbs. (7.6 kg)

Accessories

Three Year Warranty

SUPPLIED: Instruction Manual, Two PR 33A x1/x10 Probes or equivalent, AC Power Cord, Spare Fuse

OPTIONAL: PR 32A Demodulator Probe, PR 37AG x1/x10/REF. Probe, PR 100A x100 Probe, PR-55 High Voltage x1000 Probe, LC 210A Carrying Case

30 MHz Analog Oscilloscope

Model 2125A

- **Delayed sweep in 23 steps**
- **Built-in component tester for capacitors, inductors, diodes, transistors, zener diodes**
- **23 step time base to 0.1ms/div**
- **Deluxe handle/tilt stand**

Specifications

model 2125A

VERTICAL AMPLIFIERS (CH 1 and CH 2)

Sensitivity	5 mV/div to 5 V/div, 1 mV/div to 1 V/div at x5
Attenuator	10 steps in 1-2-5 sequence. Vernier control provides full adjustment between steps
Accuracy	±3%, ±5% at x5
Input Resistance	1 MΩ ±2%
Input Capacitance	25 pF ±10pF
Frequency Response	5 mV to 5 V/div: DC to 30 MHz (-3dB) X5: DC to 10 MHz (-3dB)
Rise Time	12ns (Overshoot ≤5%)
Operating Modes	CH 1: CH 1, single trace
CH 2	CH 2, single trace
ALT	dual trace, alternating
CHOP	dual trace, chopped
ADD	algebraic sum of CH 1 + CH 2
Polarity Reversal	CH 2 only
Max. Input Voltage	400 V (DC to AC peak)

SWEEP SYSTEM

Operating Modes	Main, mix (both main sweep and delay sweep displayed), or Delay (only delay sweep displayed), X-Y
Main Sweep SpeeD	0.1 μs/div to 2.0 s/div in 1-2-5 sequence, 23 steps Vernier control provides fully adjustable sweep time between steps
Accuracy	±3%
Sweep Magnification	10X, ±5%
Delayed Sweep Speed	0.1 ms/div to 0.1s/div in 1-2-5 sequence, 23 steps
Holdoff	Continuously variable for Main sweep up to 10 times normal
Delay Time Position	Continuously variable to control percentage of display that is devoted to main and delay sweep

TRIGGERING

Triggering Modes	AUTO (free run) or NORM, TV-V, TV-H
Trigger Source	CH 1, CH 2, ALT, EXT, LINE
Maximum External Trigger Voltage	300 V (DC + AC peak)
Trigger Coupling	AC 30 Hz to 30 MHz
	TV H Used for triggering from horizontal sync pulses
	TV V Used for triggering from vertical sync pulses

TRIGGER SENSITIVITY

Coupling	Bandwidth	Int	Ext
Auto	100Hz - 40MHz	1.5 div	≥ 0.1Vp-p
Norm	100Hz - 40MHz	1.5 div.	≥ 0.1Vp-p
TV-V	DC -1kHz	0.5 div	≥ 0.05Vp-p
TV-H	1 kHz - 100kHz	0.5 div	≥ 0.05Vp-p

HORIZONTAL AMPLIFIER (Input through channel 1 input)

X-Y Mode	Switch selectable using X-Y switch. CH 1: X axis CH 2: Y axis
Sensitivity	Same as vertical channel 2
Accuracy	Y-Axis: ±3%. X-Axis: ±6%
Input Impedance	ame as vertical channel 2
Frequency Response	DC to 1MHz typical (-3 dB), to 6 div horizontal deflection
X-Y Phase Difference	3° or less at 50 kHz
Max. Input Voltage	Same as vertical channel 2

CRT

Type	Rectangular with internal graticule
Display Area	8 x 10 div (1 div = 1 cm)
Accelerating Voltage	2 kV
Phosphor	P31
Trace Rotation	Electrical, front panel adjustable

COMPONENT TESTER

Components Tested	Resistors, Capacitors, Inductors, and Semiconductors
Test Voltage	6 V rms maximum (open)
Test Current	11 mA maximum (shorted)
Test Frequency	Line Frequency (60 Hz in USA)
Calibrating Voltage	1 kHz (±10%) Positive Square Wave, 0.2 V p-p (±2%)

Other Specifications

Within Specified Accuracy	50° to 95°F (10° to 35°C), ≤ 85% RH
Full Operation	32° to 104° F (0° to 40°C), ≤ 85% RH
Storage	-4° to 158° F (-20° to +70°C)
Power Requirements	Approximately 40 W
All other operating specifications are the same as model 2120A	
Dimensions (WxHxD)	7 x 14 .5 x 14.25" (180 x 370 x 440 mm)
Weight	17.2 lbs (7.8 kg)

Accessories

Three Year Warranty

SUPPLIED: Instruction Manual, Two PR 33A x1/x10 Probes or equivalent, AC Power Cord, Spare Fuse

OPTIONAL: PR 32A Demodulator Probe, PR 37AG x1/x10/REF Probe, PR 100A x100 Probe, PR-55 High Voltage x1000 Probe, LC 210A Carrying Case

TEL. (714) 921-9095, FAX (714) 921-6422

30 MHz Analog Oscilloscope

Model 2120B

- **Dual or single trace operation 5 mV/div sensitivity**
- **AUTO/NORM triggered sweep operation with AC, TVH, TVV and line coupling**
- **Calibrated 23 step time base with x 10 magnifier**
- **Compact low-profile design**

Specifications

	model 2120B

VERTICAL AMPLIFIERS (Ch 1 and CH 2)

Sensitivity	5 mV/div to 5 V/div, 1 mV/div to 1 V/div at X5
Attenuator	10 steps in 1-2-5 sequence. Vernier control provides full adjustment between steps.
Accuracy	±3%, ±5% at X5
Input Resistance	1 MΩ ±2%
Input Capacitance	25 pF ±10pF
Frequency Response	5 mV to 5 V/div: DC to 30 MHz (-3dB). X5: DC to 10 MHz (-3dB)
Rise Time	12 ns (Overshoot ≤5%)
Operating Modes	CH 1: CH 1, single trace
CH 2	CH 2, single trace
ALT	dual trace, alternating
CHOP	dual trace, chopped
ADD	algebraic sum of CH 1 + CH 2
Polarity Reversal	CH 2 only
Maximum Input Voltage	400 V (DC + AC peak)

SWEEP SYSTEM

Sweep Speed	0.1 μs/div to 2s/div in 1-2-5 sequence, 23 steps Vernier control provides fully adjustable sweep time between steps.
Accuracy	±3%
Sweep Magnification	10x

TRIGGERING

Triggering Modes	AUTO (free run) or NORM, TV-V, TV-H		
Trigger Source	CH 1, CH 2, ALT, EXT, LINE		
Maximum External Trigger Voltage	300 V (DC + AC peak)		
Trigger Coupling	AC 30 Hz to 30 MHz		
TV H	Used for triggering from horizontal sync pulses		
TV V	Used for triggering from vertical sync pulses		
TRIGGER SENSITIVITY			
Coupling	Bandwidth	Int	Ext
Auto	100 Hz-30 MHz	1.5 div	100 mV
Norm	DC to 30 MHz	1.5 div	100 mV
TV V	20 Hz-1 kHz.5 div	100 mV	
TV H	1 kHz-100 kHz	.5 div	100 mV

HORIZONTAL AMPLIFIER (Input through channel 2 input)

X-Y Mode	Switch selectable using X-Y switch. CH 1: X axis
CH 2	Y axis
Sensitivity	Same as vertical channel 1
Input Impedance	Same as vertical channel 1
Frequency Response	DC to 1 MHz typical (-3 dB)
X-Y Phase Difference	Approximately 3° at 50 kHz
Maximum Input Voltage	Same as vertical channel 1

CRT

Type	Rectangular with internal graticule
Display Area	8 x 10 div (1 div = 1 cm)
Accelerating Voltage	2 kV
Phosphor	P31
Trace Rotation	Electrical, front panel adjustable

Other Specifications

Calibrating Voltage	1 kHz (±10%) Positive Square Wave, 2 V p-p (±3%)

ENVIRONMENT

Within Specified Accuracy	50° to 95°F (10° to 35°C), ≤ 85% RH
Full Operation	32° to 104°F (0° to 40°C), ≤ 85% RH
Storage	-4° to 158°F (-20° to +70°C)
Power Requirements	100/120/220/240 VAC ±10%, 50/60 Hz, approximately 40 W.
Dimensions (WxHxD)	7 x 14.5 x 17.25" (180 x 370 x 440 mm)
Weight	17.2 lbs (7.8 kg)

Accessories

Two Year Warranty

SUPPLIED:	Instruction Manual, Two PR 33A x1/x10 Probes or equivalent, AC Power Cord, Spare Fuse
OPTIONAL:	PR 32A Demodulator Probe, PR 37AG x1/x10/REF. Probe, PR 100A x100 Probe, PR-55 High Voltage x1000 Probe, LC 210A Carrying Case

30 MHz Analog Oscilloscope W/Frequency Counter

Model 2121

- **Dual or single trace operation 5 mV/div sensitivity**
- **AUTO/NORM triggered sweep operation with AC, TVH, TVV and line coupling**
- **Calibrated 23 step time base with x 10 magnifier**
- **Compact low-profile design**
- **Built-in 50 MHz frequency counter**

Specifications

model 2121

VERTICAL AMPLIFIERS (Ch 1 and CH 2)

Sensitivity	5 mV/div to 5 V/div, 1 mV/div to 1 V/div at X5
Attenuator	10 steps in 1-2-5 sequence. Vernier control provides full adjustment between steps.
Accuracy	±3%, ±5% at X5
Input Resistance	1 MΩ ±2%
Input Capacitance	25 pF ±10pF
Frequency Response	5 mV to 5 V/div: DC to 30 MHz (-3dB). X5: DC to 10 MHz (-3dB)
Rise Time	12 ns (Overshoot ≤5%)
Operating Modes	CH 1: CH 1, single trace
CH 2	CH 2, single trace
ALT	dual trace, alternating
CHOP	dual trace, chopped
ADD	algebraic sum of CH 1 + CH 2
Polarity Reversal	CH 2 only
Maximum Input Voltage	400 V (DC + AC peak)

SWEEP SYSTEM

Sweep Speed	0.1 μs/div to 2s/div in 1-2-5 sequence, 23 steps Vernier control provides fully adjustable sweep time between steps.
Accuracy	±3%
Sweep Magnification	10x

TRIGGERING

Triggering Modes	AUTO (free run) or NORM, TV-V, TV-H		
Trigger Source	CH 1, CH 2, ALT, EXT, LINE		
Maximum External Trigger Voltage	300 V (DC + AC peak)		
Trigger Coupling	AC 30 Hz to 30 MHz		
TV H	Used for triggering from horizontal sync pulses		
TV V	Used for triggering from vertical sync pulses		
TRIGGER SENSITIVITY			
Coupling	Bandwidth	Int	Ext
Auto	100 Hz-30 MHz	1.5 div	100 mV
Norm	DC to 30 MHz	1.5 div	100 mV
TV V	20 Hz-1 kHz.5 div	100 mV	
TV H	1 kHz-100 kHz	.5 div	100 mV

HORIZONTAL AMPLIFIER (Input through channel 2 input)

X-Y Mode	Switch selectable using X-Y switch. CH 1: X axis
CH 2	Y axis
Sensitivity	Same as vertical channel 1
Input Impedance	Same as vertical channel 1
Frequency Response	DC to 1 MHz typical (-3 dB)
X-Y Phase Difference	Approximately 3° at 50 kHz
Maximum Input Voltage	Same as vertical channel 1

Frequency Counter

Display Resolution	Auto select from 0.001Hz to 1KHz depending on the frequency		
Max. Counter Range	0.1Hz to 50MHz		
Max. External Voltage	300V dc + ac peak		
Accuracy	+0.01% + 1 digit or 1/99999 +1 digit		
Time Base	18,432MHz + 10ppm (23°C±5°C)		
Sensitivity	Note:		
	1- The Counter must be set at "DC COUPLING" operation then the input signal is less than 10HZ.		
	2- The counter is operated by the "Trigger Source" CH1, CH2, or EXT.		
	Mode	Range	Sensitivity
	INT	2Hz~40MHz	≥ 1Div
	INT	1Hz~45MHz	≥ 2Div
	INT	0.2Hz~50MHz	≥ 3Div
	EXT	10Hz~50MHz	≥ 200mVrms
	EXT	1Hz~50MHz	≥ 400mVrms

CRT

Type	Rectangular with internal graticule
Display Area	8 x 10 div (1 div = 1 cm)
Accelerating Voltage	2 kV
Phosphor	P31
Trace Rotation	Electrical, front panel adjustable

Other Specifications

Calibrating Voltage	1 kHz (±10%) Positive Square Wave, 2 V p-p (±3%)

ENVIRONMENT

Within Specified Accuracy	50° to 95°F (10° to 35°C), ≤ 85% RH
Full Operation	32° to 104°F (0° to 40°C), ≤ 85% RH
Storage	-4° to 158°F (-20° to +70°C)
Power Requirements	100/120/220/240 VAC ±10%, 50/60 Hz, approximately 40 W.
Dimensions (WxHxD)	7 x 14.5 x 17.25" (180 x 370 x 440 mm)
Weight	17.2 lbs (7.8 kg)

Accessories

Two Year Warranty

SUPPLIED: Instruction Manual, Two PR 33A x1/x10 Probes or equivalent, AC Power Cord, Spare Fuse

OPTIONAL: PR 32A Demodulator Probe, PR 37AG x1/x10/REF. Probe, PR-100A x100 Probe, PR-55 High Voltage x1000 Probe, LC 210A Carrying Case

TEL. (714) 921-9095, FAX (714) 921-6422

Oscilloscope Accessories

General Purpose Oscilloscope Adapter Kit

CC540

Economical Accessory Kit for General Purpose Oscilloscope Instruments:

Features:

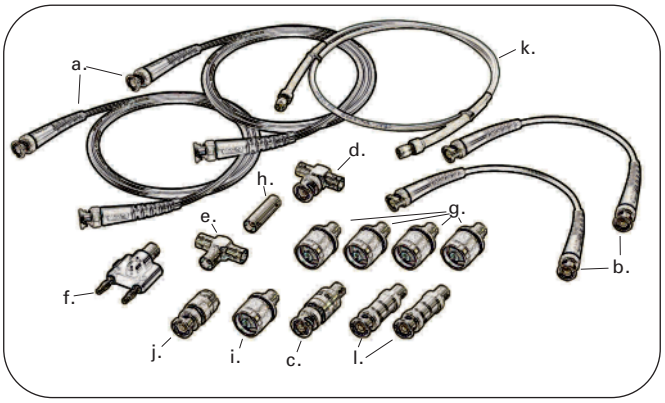
- **BNC & N Type 50Ω Connectors**
- **Gold plated center contacts**
- **Storage case**

Applications:

- **Production Test Stations**
- **Service & Repair Facilities**
- **Educational Test Benches**
- **Calibration Work**

Model CC 540 General Purpose Oscilloscope Adapter Kit provides a range of BNC and N Type coaxial interconnection for general purpose oscilloscope test interconnections. All components feature standard BNC or N type connectors with 50Ω impedance to ensure accurate measurements. The kit is provided in a convenient foam lined storage case for easy selection and use.

Kit Contents:



Itm.	Description	Qty.	Frequency Range	VSWR Max.
a.	BNC male Cable, 100cm (40")	2	DC - 1 GHz	1.20:1 @ 1 GHz
b.	BNC male Cable, 25cm (10")	2	DC - 1 GHz	1.20:1 @ 1 GHz
c.	BNC Feed-Thru Terminator, 2W	1	DC - 1 GHz	1.35:1 @ 1 GHz
d.	BNC Tee, female-male-female	1	DC - 4 GHz	N/A
e.	BNC Tee, female-female-female	1	DC - 4 GHz	N/A
f.	BNC female to Double Banana Plugs	1	N/A	N/A
g.	BNC female to N Type male	4	DC - 4 GHz	1.30:1 @ 4 GHz
h.	BNC female-female	1	DC - 4 GHz	1.30:1 @ 4 GHz
i	N Type male to SMA female	1	DC - 8 GHz	1.30:1 @ 8 GHz
j	BNC male to N Type female	1	DC - 4 GHz	1.30:1 @ 4 GHz
k	SMA male Cable, 100cm (40")	1	DC - 6 GHz	1.20:1 @ 6 GHz
l.	BNC Attenuator, 20dB (10x) 2W	2	DC - 4 GHz	1.25:1 @ 4 GHz

Special BNC Cable Assemblies

Models CC-21 & CC-130

Standard BNC to Alligator clips or Sheathed Stacking Plugs. Model CC-21, Black, molded strain release boots provides for long-life. RG58C/U cable with 50Ω impedance. Model CC-130 with fully insulated BNC male to Sheathed Stacking 4mm plugs. Meets IEC61010 safety standards Includes highly flexible RG58 Type cable in 2.0 meter length. Color: Black.

Features	model CC-21	CC-130
Impedance	50Ω	50Ω
Cable	RG58 C/U	RG58 Type
Connectors	BNC m to Alligator Clips	Insulated BNC male to 4mmPlugs
Voltage	500Vrms	150V CAT II
VSWR	≤ 1.2	≤ 1.2
Cable Length	40" (1.0m)	80" (2.0m)

Demodulator Probe Model PR 32A

All purpose demodulator probe, usable with most oscilloscopes. Features light weight design and 48" (1.2m) coaxial cable.

Features	model PR-32A
Bandwidth	100kHz-650MHz
Accuracy	±3dB
Voltage	200V
HF Voltage	50Veff
Actuating Voltage	250mV
Input Capacitance	5pF
Cable Length	48" (1.2m)
Body Color	Black

See page 140 through 151 for additional oscilloscope and general purpose accessories

Oscilloscope Accessories

General Purpose Probes

B+K Precision offers a complete line of oscilloscope probes to enhance the versatility of your unit. Both fixed attenuation and switchable from 100 to 250 MHz are available. Each probe includes a full accessory kit with a Sprung Hook, Replacement Tip and BNC Adapter.

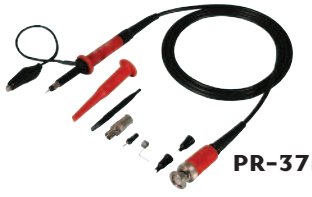
- **All models compliant to IEC61010-031**

PR-33A

PR-100A

PR-37AG

PR-2000



PR-37AR

PR-4000

PR-150

PR-55

Active Differential Probe

Model PR-60

Allows safe and accurate floating measurements with your standard analog or digital oscilloscope. Switchable between x10 and x100 attenuation. Unit includes black and red probes and protective rubber jacket.

Features

	model PR-60
Bandwidth	25MHz (-3dB)
Attenuation Ratio	x10/x100
Accuracy	±2%
Rise Time	14 ns
Input Impedance	4MΩ/10pF each side to ground
Input Voltage	
Max. Differential	±700V (DC+Peak AC)
Max. Common Mode	±700V (DC+Peak AC)
Output Voltage	
Max. Amplitude	±7V (into 2kΩ load)
Offset (Typical)	≤ ±5mV, -10°to 40° C
Noise (Typical)	1.5 to 2mV
Source Impedance	1Ω @ 1kHz 8Ω @ 1MHz
CMRR	
50Hz	86 dB
20kHz	66 dB
200kHz	56 dB
Probes	Sprung Hooks (B/R)
Length of Input Lines	18" (45cm)
Operating Temperature	14° to 104°F (-10° to 40°C)
Power Requirements	4 x AA Cells
Certification	IEC61010-1 CATIII

Specifications

	PR 33A	PR 37AG	PR 37AR	PR 150	PR 100A	PR 2000	PR 4000	models PR-55
Bandwidth (MHz)	15/90	6/150	6/150	25/150	250	150	100	50
Attenuation	x1/x10	x1/x10/REF	x1/x10/REF	x1/x10	x100	x100	x100	x1000
Input Impedance								
R(MΩ)	1/10	1/10	1/10	1/10	100	50	50	100
C(pF)	46/16	100/15	100/15	45/12	6.5	5	5	1
Voltage (VDC+ACmax)	600	600	600	300	1,200	2,000	4,000	10,000
Compensation (pF)	10..35	10..35	10..35	10..30	10..35	10..30	10..30	10..30
Cable Length	48" (1.2m)	48" (1.2m)	48" (1.2m)	48" (1.2m)	48" (1.2m)	48" (1.2m)	48" (1.2m)	80" (2.0m)
Body Color	Black	Gray	Red	LtGray	Black	Red	Red	Yellow